Technology Review

Edited at the Massachusetts Institute of Technology

May, 1964

Sailing Champion, Page 27

The Scientific Origins Of Modern Engineering

By George R. Harrison, Page 15

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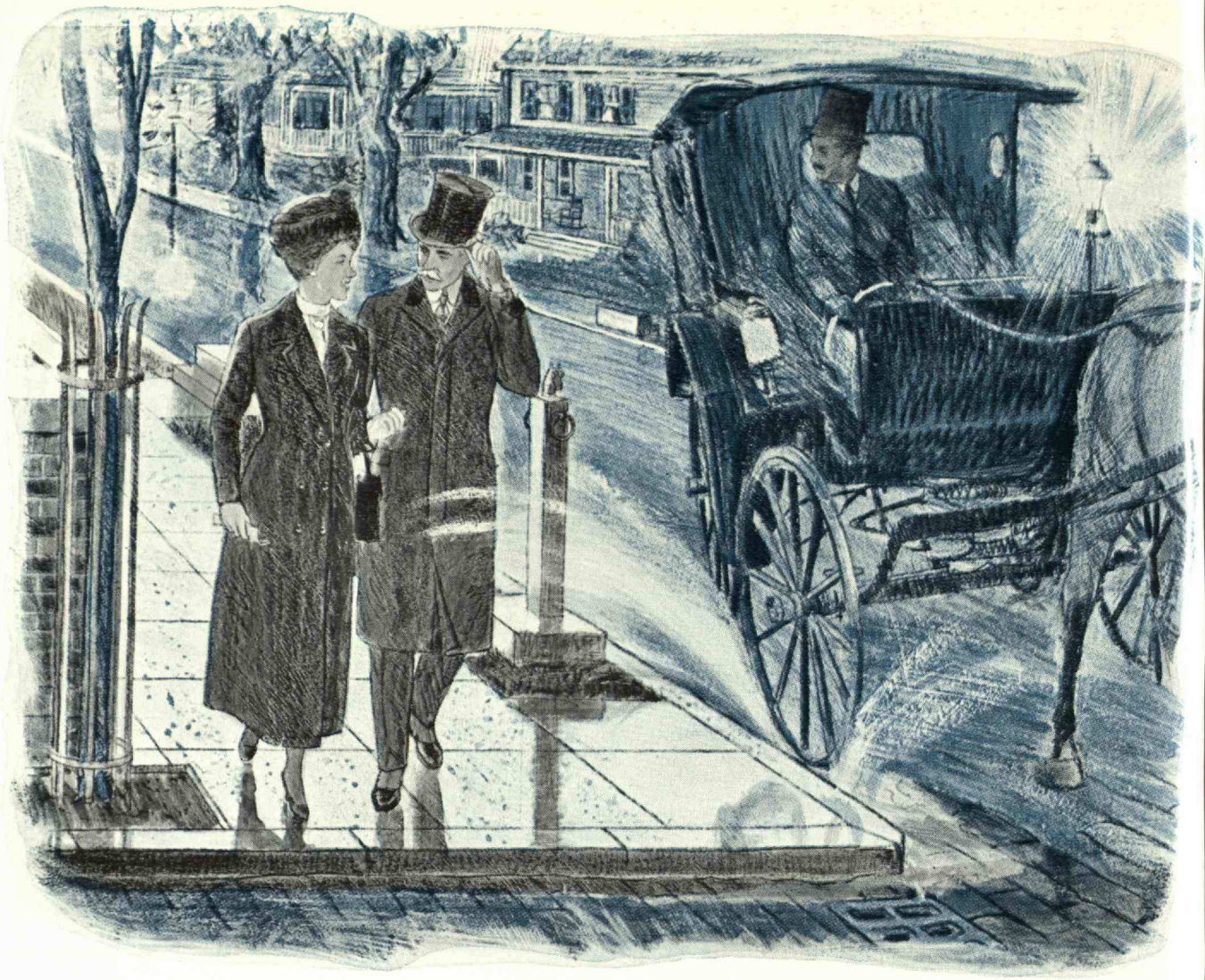

Back in the days
when roadways were drained poorly if at all, street gutters could get rather messy. Wheels and hooves sloshing through presented a major hazard to feminine silks and satins ... so the gentleman walked on the curb-side of the pavement to avert disaster to his lady's finery as best he could. Gentlemen walk on the outside to this day, though the need for this kind of protection has lessened, at least a little.

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A custom among knowing cable buyers—now almost a reflex, like walking on the outside—is specifying Kerite for protection that *endures*. Many, many miles of Kerite cable installed 40, 50, even more years ago, are still in service today and functioning perfectly. Many more miles installed since reflect design improvements, the most advanced techniques of manufacture and long term testing, to keep time-proved Kerite cable the most thoroughly up-to-date. Some customs may persist beyond the reasons for them. But the reason for buying Kerite is more valid today than ever: long-term economy through cables that last and last.
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A description of the Laboratory's work will be sent upon request.

ROBERT CAPRANICA, a young researcher from Bell Telephone Laboratories, is studying the croaking of frogs in an artificial lily pond at M.I.T. His novel communication research project is described in the article on page 31 this month.

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Cambridge, Mass. 02139

The Review's publisher and editor is *Volta Torrey;* business manager, *R. T. Jope, '28;* assistant to the editor, *Ruth King;* and class news editor, *Roberta A. Clark.* Editorial consultants are *J. J. Rowlands, Francis E. Wylie,* and *John I. Mattill.* Members of its staff are *Joyce Skinner* and *Maxine Kenny.*

Officers of the Alumni Association of M.I.T are: *Robert H. Winters, '33,* President; *Donald P. Severance, '38,* Executive Vice-president; *F. Leroy Foster, '25,* and *Samuel A. Groves, '34,* Vice-presidents; and *Frederick G. Lehmann, '51,* Secretary.

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Technology Review

Reg. U.S. Pat. Off.

Edited at the Massachusetts Institute of Technology

Volume 66, Number 7

Contents

May, 1964

The Cover shows Joe Duplin (second from right) in a world championship race on the Gold Cup Course on Lake Michigan. The man hanging over the side is Lowell North, who was a three-time world champion.

Individuals Noteworthy

Norbert Wiener: 1894-1964

ONE of the world's most productive and admired mathematicians, Institute Professor, Emeritus, Norbert Wiener, died in Stockholm last March 18 while visiting friends at a hearing aid laboratory.

Prosthetic devices that involve both human and mechanical systems of communication and control fascinated Professor Wiener in recent years. He had inspired and taken part in efforts to improve artificial hands and limbs. He also had thought much about hearing aids, especially after noting the music at a Boston performance of the Russian circus last year, and he hoped that ways could be found to enable more deaf people to hear.

Professor and Mrs. Wiener left Cambridge last January 20 soon after he received the National Medal of Science from President Johnson in Washington. They had gone to the University of Amsterdam, which planned to make him an honorary professor of medicine, and from there to Norway and Sweden. He expected to lecture at the Swedish Royal Institute in Stockholm, and to go later this year to the Spring School of Cybernetics in Naples and the Institute for Advanced Study in Mexico City.

Professor Wiener enjoyed his many trips abroad and took pride in being welcome and at home virtually everywhere. He rarely admitted just how many languages he knew, but they included Chinese, and he seemed capable of instantly recalling in detail nearly all of the world's great literature.

Mathematical irregularities were his scientific specialty and he strove to formulate procedures to minimize them and thus bring nature's random movements together in a harmonious whole. He credited the motion of the waves in the Charles River with having inspired his development of analytical techniques applicable in both electrical engineering and the examination of brain waves. He founded the science of cybernetics, named it, encouraged its use for benign purposes, and denounced military and commercial applications of it which he considered ignoble.

His last book, *God and Golem, Inc.*, finished last summer in Sandwich, N.H., dealt with the impingement of cybernetics on religion. The creation of machines capable of learning and reproducing themselves will give us no rest from thinking, but will subject us to sins no different than simony and sorcery, he believed, and this book was a final plea to others to "render unto man the things which are man's and unto computers the things which are computer's." The Mayor of Cambridge carried a copy of it with him to Rome this spring to present to the Pope.

Professor Wiener's fame for his mathematical work was rivaled by that brought to him by his amazing versatility, his personality, and his cordiality. Both his technical and nontechnical works were widely quoted, and *The Human Use of Human Beings* modified a popular image of "the scientist." Representatives of all the world's great communication media sought him out, and nearly always left his company feeling that they had touched the sleeve of greatness.

His life story was well known. He told it in two books, *Ex-Prodigy* and *I Am a Mathematician*. Born and bred, as he said, to the scholar's trade, he was graduated from Tufts at the age of 14 and received his doctorate in philosophy from Harvard when he was 18. Throughout his life he defended the right of gifted children to privacy, but he made no secret of his own suffering.

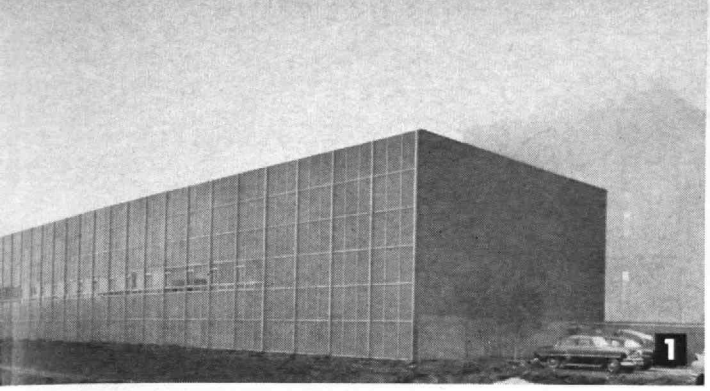
After postgraduate study at Cambridge, England, at Göttingen, in Copenhagen, and at Columbia University with such men as Bertrand Russell, G. H. Hardy and John Dewey, he taught briefly at Harvard and the University of Maine. He also tried reporting for the Boston *Herald* and writing for the *Encyclopedia Americana*. He was accepted into the armed services during the first world war, after repeated efforts to enlist, and assigned to the Aberdeen Proving Grounds. Then he came to M.I.T. as an instructor in 1919, and became assistant professor in 1924, associate professor in 1929, professor in 1932, Institute professor in 1959, and emeritus in 1960.

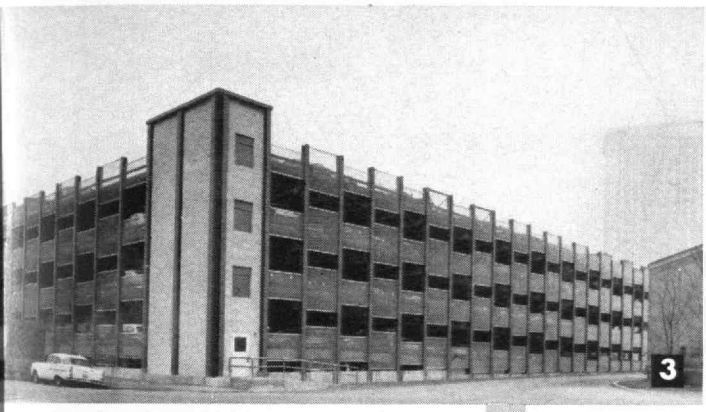
Throughout his 45 years at the Institute, he was noted for the length of the equations he put on

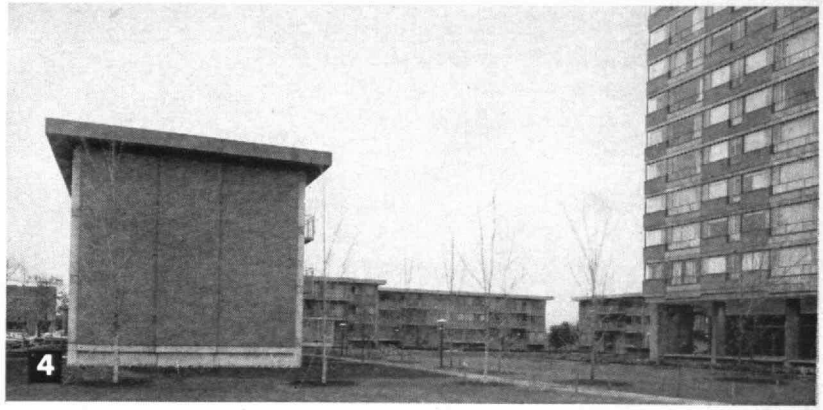
(Continued on page 6)

Assistant Professor Norbert Wiener working at his M.I.T. desk in the 1920's.

FRANKI FACTS







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TYPICAL SOIL PROFILE
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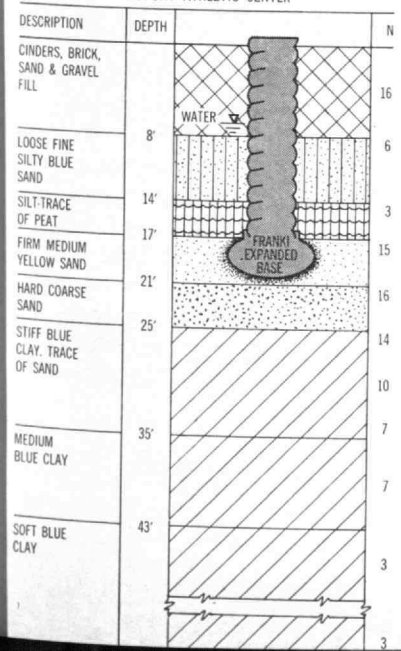

Franki Foundations at M.I.T.

Problem

One of the major problems encountered by Massachusetts Institute of Technology as it expands its facilities to meet the increasing demands of the Space Age, is the selection of safe and economical foundations. The campus is underlain, typically, by about 20 feet of fill and peaty silt, a crust of sand and gravel of varying thickness, and the deep deposit of soft blue clay common to much of the Boston area.

At the David Flett du Pont Athletic Center (No. 1) it was decided to support the building on the crust. Since the sand layer varied from 8 to 12 feet in thickness, piles were subject to the objection that they might "punch through" to the clay, and an excavated caisson foundation would have to bear the heavy and indeterminate cost of large-scale dewatering.

Solution

The Engineers decided to investigate the Franki system of displacement caissons or pressure-injected footings, because of Franki's unique ability to forge a footing with 140,000 ft.–lb. blows at a predetermined depth in the top of the sand layer, creating both an expanded base and a large zone of densified sand, thus improving the natural "mat" action of the crust. They found that Franki was prepared to guarantee satisfactory installation of the caissons at a fixed lump sum price, eliminating contingencies for extra length or dewatering.

The Engineers' final design involved 215 Franki caissons, in groups of 2 to 6 units, carrying individual loads of 65 to 80 tons. The controlling factor was of course the stress applied to the clay, and the number and spacing of the caissons at each column was so arranged as to keep that stress relatively constant, and within the limit of 1 ton per sq. ft. generally accepted for soft Boston Blue Clay.

A load test to double design load in the most critical area, where the sand stratum was only 8 feet thick, (net settlement 0.24″) proved the safety of the design.

Results

The du Pont Athletic Center has now been in service for four years, and the design assumptions have been fully confirmed.

In the meantime the Institute and its various professional consultants, listed at left, have specified Franki guaranteed lump-sum-price foundations on the Burton-Conner Dining Hall (No. 2), the large Parking Facility at Main & Vassar Streets (No. 3), and on the four low-rise buildings of the Married Students Quarters complex (No. 4), now being dedicated. Unit loads on these structures ranged up to 120 tons per caisson.

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Literature — This series of job highlights, as well as other descriptive literature, will be sent to you upon request to Franki Foundation Company, 103 Park Ave., New York 17, New York.

Individuals Noteworthy

(*Continued from page 4*)

blackboards and the speed with which he erased them. Professor Yuk-Wing Lee, '27, Associate Professor Amar G. Bose, '51, and other former students produced one of Norbert Wiener's last mathematical books for him (*Nonlinear Problems in Random Theory*) from tape recordings and 400 snapshots of his blackboard taken while he was giving what was to have been five and turned out to be 15 lectures.

Despite his poor eyesight, he read and worked swiftly, and often found time to stroll the corridors, chat in a foreign language with a student, philosophize with a colleague, and discuss the day's biggest headline with a friend. He called many an old friend "boss."

The way the world turns, and the rigidity of most men's thinking in all countries, sometimes depressed Professor Wiener and his jests often were bitter. But he enjoyed bridge, the movies, and small talk about national and world affairs.

The anecdotes about him are endless. Some of the stories that have been told and re-told are apocryphal and others resulted from his nearsightedness and his intense concentration on major rather than trivial matters. Yet he, too, enjoyed the stories.

"We respected him," said President Julius A. Stratton, '23, in the report of his death sent to the Faculty, "not alone for his productive and creative mind, but equally for his warmth of understanding and for his humanity."

Professor Wiener is survived by his wife, two daughters, his mother, a brother, and two sisters.

Honored in Milan

THE Polytechnic Institute of Milan, Italy, honored Provost Charles H. Townes of M.I.T. and its own Professor Giulio Natta, winner of this year's Nobel Prize in Chemistry, at ceremonies in the La Scala Opera House on April 3 commemorating the 100th anniversary of the founding of the Institute.

Electronics Conferees

PROFESSOR Wayne B. Nottingham, who will retire this year, was honored at a dinner on March 26 by former students attending the 24th annual Physical Electronics Conference that he has arranged for them. John F. Waymouth, Jr., '50, of Sylvania Electric Products, Inc., will organize and conduct future such by-invitation-only conferences with the assistance of a committee consisting of Professor Edward A. Coomes, '38, of Notre Dame University; Andrew R. Hutson, '54, of Bell Telephone Laboratories; David B. Langmuir, '35, of Space Technology Laboratories, and John M. Houston, '55, of General Electric Research Laboratories.

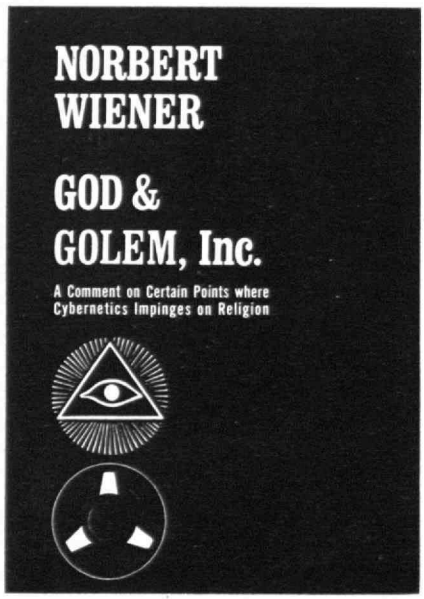
Attendance at the very special alumni gatherings that Professor Nottingham started in 1935 has been limited to 250, and unlimited, spontaneous discussion has been permitted, to encourage the maximum exchange of knowledge among men concerned with physical electronics.

(*Continued on page 8*)

A Story Professor Wiener Often Recalled

NORBERT WIENER told W. W. Jacobs' story about "The Monkey's Paw" to many interviewers. In "God and Golem, Inc.," he summarized it, in these words:*

"In this tale, an English working family is sitting down to dinner in its kitchen. The son leaves to work at a factory, and the old parents listen to the tales of their guest, a sergeant-major back from service in the Indian army. He tells them of Indian magic and shows them a dried monkey's paw, which, he tells them, is a talisman which has been endowed by an Indian holy man with the virtue of giving three wishes to each of three successive owners. This, he says, was to prove the folly of defying fate.



"He says that he does not know what were the first two wishes of the first owner, but that the last one was for death. He himself was the second owner, but his experiences were too terrible to relate. He is about to cast the paw on the coal fire, when his host retrieves it, and despite all the sergeant-major can do, wishes for £200.

"Shortly thereafter there is a knock at the door. A very solemn gentleman is there from the company which has employed his son. As gently as he can, he breaks the news that the son has been killed in an accident at the factory. Without recognizing any responsibility in the matter, the company offers its sympathy and £200 as a solatium.

"The parents are distracted, and at the mother's suggestion, they wish the son back again. By now it is dark without, a dark windy night. Again there is a knocking at the door. Somehow the parents know that it is their son, but not in the flesh. The story ends with the third wish, that the ghost should go away. . . .

"The magic of automation, and in particular the magic of an automatization in which the devices learn, may be expected to be similarly literal-minded. If you are playing a game according to certain rules and set the playing-machine to play for victory, you will get victory if you get anything at all, and the machine will not pay the slightest attention to any consideration except victory according to the rules. If you are playing a war game with a certain conventional interpretation of victory, victory will be the goal at any cost, even that of the extermination of your own side, unless this condition of survival is explicitly contained in the definition of victory according to which you program the machine."

*It appeared in *The Lady of the Barge* (Dodd, Mead & Co.) and in *Modern Short Stories,* Margaret Ashmun, Ed. (Macmillan Co., 1915).

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Individuals Noteworthy

(Continued from page 6)

New Professors

PROVOST Charles H. Townes has announced the promotion of the following members of the M.I.T. Faculty to the rank of professor:

Robert L. Halfman, '44, and *James W. Mar, '41,* Aeronautics.

Cecil E. Hall, '48, Biology.

Herbert O. House, Chemistry.

Abraham J. Siegel, Economics.

Edward W. Merrill, '47, Chemical Engineering.

Murray Eden, Marvin L. Minsky, George C. Newton, Jr., '41, and *John M. Wozencraft, '51,* Electrical Engineering.

Henry M. Paynter, '44, Mechanical Engineering.

Gregory Tucker, Humanities.

Edward H. Bowman, '46, and *Edgar H. Schein,* Industrial Management.

Nesmith C. Ankeny, Louis N. Howard, and *Hartley Rogers, Jr.,* Mathematics.

Ali Javan, Arthur K. Kerman, '53, George F. Koster, '48, Louis S. Osborne, '50, and *Irwin A. Pless,* Physics.

Associate Professors

MEMBERS of the M.I.T. Faculty promoted to the rank of associate professor this spring were:

Myron A. Hoffman, '51, and *Gordon C. Oates,* Aeronautics.

Henry A. Millon, Architecture.

Justin E. Kerwin, '53, Naval Architecture.

Glenn A. Berchtold, Glen E. Gordon, Gordon G. Hammes, William R. Moore, and *Walter R. Thorson,* Chemistry.

Ernest F. Bisbee, Jerome J. Connor, Jr., '53, John F. Kennedy, and *Charles C. Ladd, '55,* Civil Engineering.

Robert G. Gallager, '57, James W. Graham, '52, Paul E. Gray, '54, Irwin M. Jacobs, '57, William T. Peake, '51, and *Paul L. Penfield, Jr., '60,* Electrical Engineering.

Thomas B. Sheridan, '59, Mechanical Engineering.

David D. Lanning, '63, Nuclear Engineering.

William F. Pounds, Barnard E. Smith, Andrew C. Stedry, and *William P. Travis,* Industrial Management.

Michael Artin, and *W. Gilbert Strang, '55,* Mathematics.

Marcus Karel, '60, Nutrition.

George Bekefi, William Bertozzi, '53, Jerome I. Friedman, and *Lawrence Rosenson,* Physics.

Honors to Professors

THEOS J. THOMPSON, Professor of Nuclear Engineering, was one of five named by the Atomic Energy Commission to receive Ernest O. Lawrence Memorial Awards this year. . . . Professor *Arthur T. Ippen* has been appointed to the advisory board of the U.S. Army Coastal Engineering Research Center. . . . Professor *Robert V. Whitman, '49,* received a 1963 Structural Section Award from the Boston Society of Civil Engineers.

Wilson Fellows

EIGHT M.I.T. students won Woodrow Wilson fellowships this spring for a year of graduate study next fall. They were Ned J. Block, Douglas T. Browne, Kenneth H. Kaiser, Tehmau Kan, Bernard Shiffman, Eugene R. Speer, Jr., Gordon S. Wassermann, and Alan D. Weinstein.

Honorable mention was given Michael L. Burton, Maurice A. Finocchiaro, David F. Freeman, Lita L. Markley, John D. Nagle, Martin T. Poe, 3d, and Donald C. Shapero.

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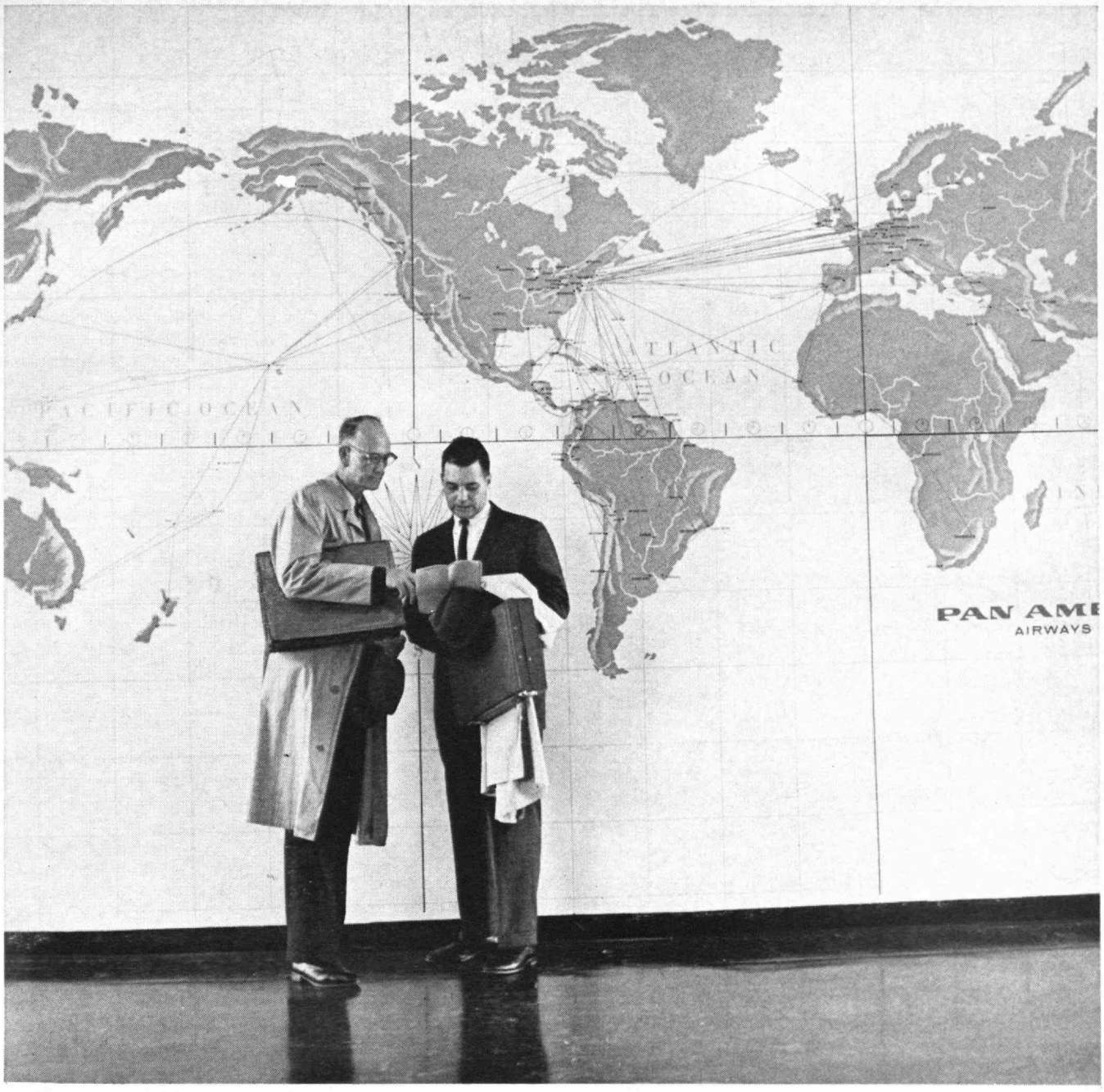

Henry Koller, James Barron: Men of the World

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Feedback

"A Characteristic"

From Y. CHATANI, '22:

We were grieved to learn the death of the Institute Professor, Emeritus, Dr. Norbert Wiener while visiting Stockholm.

Dr. Wiener was such a great mathematician and philosopher and a characteristic of the Institute, for which we had a great admiration and regard. It was a great loss. You would be interested to know that the leading local newspaper *Asahi Shinbun* devoted a good deal of space to relating his death.

Mrs. Chatani and I have written a letter of sympathies to Mrs. Wiener as we were well acquainted with Dr. and Mrs. Wiener while they visited here years ago.

Kishimoto Warehouse Company,
Chiyoda-Ku, Tokyo

The Two Childs Problem

From SHERMAN P. SACKHEIM, '43:

Re: your article, "Our Manner of Speaking," in the February, 1964, issue —here are some sidelights which might interest you and your readers.

To grasp the fundamentals of plurals —I tried some of the author's suggestions on my nearly six-year-old, with the following results:

Q. If one boy is a child, what are two of them? A. Twins.

Q. Yes, but—what is a child and a child? A. Two childs.

Q. No—two of them (holding up fingers). A. Two fingers.

Q. No—try again. One child and another child. A. A pair.

Q. OK—let's try another. How about an ox and an ox. A. Oxes.

Q. No—it's oxen. How about an axe and an axe. A. Axen.

How can we expect computers to understand us, if we can't even understand the logic of our own children?

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The Scientific Origins Of Modern Engineering

An article drawn from a talk at the regional conference of Alumni this year in Cleveland

BY GEORGE R. HARRISON

Dean Emeritus, M.I.T. School of Science

MOST of my scientist friends seem to take it for granted that the modern advances in technology seen on every hand have resulted from the amazing scientific discoveries made in earlier years. In other words, technology and engineering follow naturally from science, and depend upon it.

My engineer friends, on the other hand, usually protest violently against such an attitude, and claim that the most important modern discoveries have been made by technologists and engineers. Afterwards scientists came along and worked out theories to explain what was happening. One former dean of engineering even insists that many of the greatest industrial processes, such as those involving catalysis on a large scale, still operate in ways which were developed empirically, and that no one has the slightest idea as to why many of them work.

When I came to M.I.T. in 1930 the scientists, a small minority, tended to feel rather inferior in the midst of all the wonderful engineers. The physicists particularly felt put upon, and compensated with an inordinate amount of chest-swelling. People knew what biologists were, and chemists, but no layman knew what a physicist was. No newspaper reporter would dare use the term, even if he knew how to spell it. When a physicist did something really outstanding he was referred to by some euphemism such as "chemist" or "engineer." Even the term "physical education" had been usurped by a more muscular discipline. So the national professional societies of physicists formed all sorts of committees to try to increase public awareness of what physicists did.

Now we have lived to see a different day. Special committees of engineers are being appointed to find ways of making the public more aware of what engineers are and do. Methods are being sought to keep scientists from stealing credit for rocketry, radar, and the other miraculous things that engineers have been doing.

The worries of the modern engineer were outlined in an excellent article by Thomas Hughes, Associate Professor of History of Technology at M.I.T., in the March (1964) issue of The Technology Review. "The public," he says, "should be as informed about the engineer as it is about the scientist . . . I fear that the emphasis and publicity given to the scientist today prevents the engineer from playing his traditional role."

Back of such complaints is the belief, well stated by Hughes, that many students who in past years would have sought an education as engineers are now entering science instead, in the mistaken belief that scientists are responsible for many of the glamorous fields which belong, in fact, in engineering.

Such misapprehensions most certainly exist, but the scientist is likely to feel that a long period of imbalance is now being rectified. He suspects that many students went mistakenly into engineering in the past because they had so little chance to find out about science.

With great amounts of truth on both sides good-natured argument on this subject is likely to persist for some time. A look at the origins of engineering, such as that given by Hughes, clarifies the situation somewhat, but we need better definitions of terms; of science and engineering, and especially of applied science and technology.

Science, says Webster, "is a branch of study concerned with the observation and classification of facts, and the formulation of verifiable general laws." Fair enough, but then he quotes Jevons: "A science teaches us to know, an art to do. All the more perfect sciences lead to useful arts." So here one might see the arts of engineering emerging from the knowledge of science. Let us not pause for a reply.

When one comes to technology Webster appears to define his terms somewhat in circles. Technology is industrial science, he says; it is the systematic knowledge of the industrial arts; it is applied science contrasted with pure science; it is any practical art utilizing science. While all of these statements may be accepted in part, they lead to confusion if pressed too closely. We need to distinguish more clearly between technology and applied science.

To complete the formal definitions, Webster says, "Engineering is the art and science by which the proper-

ties of matter and the sources of power in nature are made useful to man in structures, machines, and manufactured products." Then he goes on to list 58 varieties of engineering, ending up with *etc.* to cover the many other branches already with us and yet to come.

Remembering that no definition only a sentence long can be expected to stand up under scrutiny, we may get away from the various meanings of art and science which Webster invokes by agreeing on some rough-hewn ready-cut descriptions. Let us say that physical science is man's systematized body of knowledge of the behavior of matter and energy; that applied science is the devotion of this knowledge to the achievement of desired ends; that technology is man's total body of information and experience which indicates how a desired result can be achieved by controlling matter and energy; and that engineering is the systematic application of science, technology, economics, and art to achieve desired results in the most effective manner.

When discussing the origins of engineering it is especially important to emphasize the word *systematic* in this last definition. As is well known, the early development of engineering was controlled by empiricism —try a lot of ways of doing something until you find one that will work, or the one that works best. This, sometimes called the Edisonian method, is neither science nor engineering, and is the system followed by the typical inventor of the old school. It combined a knowledge of technology with a considerable degree of art, that is, of aptitude and skill.

Modern engineering, on the other hand, is distinguished by systematic experimentation and analysis, and requires a combined mastery of facts (science), experience (technology), and method (experimentation and analysis). Since the engineer must choose the most effective way of accomplishing a desired result, his analysis must involve matters of cost as well as feasibility— a matter of indifference to the prideful scientist.

Now let us look at the origins of various branches of engineering. Civil, mechanical, and mining engineering are classical disciplines which have become increasingly less empirical and more analytical from the time their parent technologies emerged from the hunt-and-try stage. They are now rigorous systematic disciplines of analysis, experimentation, and art. Are the contributions of science to these fields greater or less than those of technology?

The modern civil engineer uses computing machines; he does much of his surveying from airplanes by means of photogrammetry; he considers the use of energy from nuclear fission for the construction of large canals and harbors. All of these involve liberal doses of science, but the contribution usually has been fed in from the side, so to speak, rather than controlling. The classical fields of engineering were well-developed structures before science rose to its modern stature. They have been modified by science, but it had little to do with their origins.

Since mathematics is basic to all engineering, one might argue that a major contribution of science to engineering has been precise methods of thought. But engineers can justly reply that they themselves have been just as responsible as scientists for developing these rigorous methods.

More modern fields, such as aeronautical engineering, have a debt to science which, although somewhat more evident, still is only diffusely related to origins. Balloons aside, the first problem of flight was the stabilization of the airframe. A great group of empiricists and a few scientists experimented with gliders before the Wright brothers provided the final touch needed to give stability, the warped wing or aileron. But the Wright brothers were doers rather than systematic thinkers; they were technologists and experimental developers of an art rather than scientists or engineers.

The power plant, a development of technology and increasingly of engineering, has developed through the steam engine, the internal combustion engine, the turbojet, and then the true jet, which goes back in concept to physical principles known vaguely to Hero of Alexandria. These engines are all products of technology aided by the new materials and design methods developed by modern metallurgical and mechanical engineers. Going further, the development of satellites and rockets needs much more engineering than science.

Chemical engineering, which has less to do with chemistry than with chemicals, is concerned mainly with the science of thermodynamics, with analysis, and with numerous modern technologies. The greatest chemical engineers combine these with art, that is, with certain skills and insights which have origins in mankind far older than those of science.

The origins of electrical engineering emerge somewhat more clearly, but the mixture is as before. This discipline was formally spun off from physics toward the end of the last century, and for some time has found itself split into two branches, concerned respectively with the transmission of power and of information. Both branches had very specific scientific origins, followed by long periods of progressive development through technology.

Power engineering resulted from the discoveries in 1831 and 1832, by Michael Faraday and Joseph Henry, of electromagnetic induction. I am not impressed by Professor Hughes's statement that any engineer can digest in half an hour the import of these discoveries; what is important is the time that engineers would have required to reach independently the conclusions conveyed by the discoveries, if there had been none.

This very basic contribution of science was followed by a half century or more of empirical development at the hands of a series of great technologists such as Edison, who were followed by the first real electrical engineers, men like Steinmetz and Elihu Thomson. Today the power aspects of electrical engineering appear to have reached a plateau. The technology has been well worked out, and new sources of power, such as the nuclear reactor, will affect neither the basic methods nor the methods of calculation of the power engineer. The electric motor is now an equal partner with the internal combustion engine, but for it to supplant the heat-based device completely will require new discoveries so fundamental that they are likely to involve much science. The fine work of engineers in developing fuel cells, plasma converters, and other new devices for transforming energy will pay off the sooner, the more science-based they are.

Much more rapid than the present growth in power engineering is that in communications and electronic

engineering. These again have origins which can be traced to scientific discoveries less than a century old, with further and earlier progress nourished by technology and engineering.

Hertz's discovery of radio waves after their prediction by Maxwell on theoretical grounds is known to every student. The powerful combination of a theoretical physicist, predicting through mathematical reasoning a new phenomenon which an experimental physicist then proceeds to find, has often led to a new field of engineering. In radio communication it was the determined empiricism of Marconi that brought these discoveries into first flower.

The electron was discovered, weighed, and measured by physicists from J. J. Thompson to Millikan between 1896 and 1914. Yet its isolation was made possible almost entirely by the development of high-vacuum technology, contributed to almost equally by scientists and by technological inventors. This made it possible for Hittorf, Crookes, and others to pump the air out of glass vessels and observe electrical discharges in gases at low pressure. By the time the electron was available for use in the cathode-ray tube, the ancestor of the electronic oscilloscope and the television picture tube, much empirical technology was available to aid in the development of the amplifier tube.

It is unnecessary to recount again how Edison contributed his one bit of science (or was it technology?) with his empirical discovery that a current would flow one way through the vacuum of an incandescent lamp but not the other. This Edison effect was used by Fleming with a neat bit of applied science in his electric valve, and that in turn was used by De Forest in the first amplifier-detector, through a vague but very bright idea and almost complete empiricism. The resulting electronics industry, with its further proliferation of vacuum-tube devices, then became the basis of the communications art, shifting it almost completely from the brute-force engineering and technological devices of early radio, which were nevertheless shot through with the science of oscillating circuits.

Today we find the scientist coming into the center of the electronics picture again with the contributions of solid state physics, which to a great degree have arisen from theoretical developments of quantum mechanics. Now an electron is found able to do its controlled work quite as well within the confines of materials such as germanium, silicon, and other semiconductors as in a vacuum, and with many new advantages. We have photo-conductive instruments, solid state rectifiers, the thermistor, the transistor, and a host of other solid state devices which carry out, with smaller power requirements and in much less volume, most of the functions of the vacuum tube. Nowhere is the fruit of such developments more apparent than in computer technology, eagerly being used by both engineer and scientist, and soon to give rise to its own branch of engineering.

Outstandingly characteristic of both science and engineering today is a strong trend away from the empirical and descriptive toward the analytical and quantitative. How men count is always important to science, both pure and applied, and the electrical computer is likely to supplant the slide rule as symbol of the new engineer. From counting on fingers through pebbles, beads, gear teeth, vacuum-tube pulses to transistors we can follow an almost unbroken development of guided analytical experiment, physical or mental. In computers we see a perfect marriage of science and engineering on the bed of technology.

ADMITTEDLY, in the past the origins of engineering partook more of technology than of science. But the fields of engineering that have arisen in recent times have very scientific origins. Nuclear engineering, almost full-fledged less than 20 years after the first mass production of nuclear energy from fission, stems from the theoretical discoveries made by Einstein in 1905, and from the experiments of Rutherford and many others in the years immediately following. It is developing its own technologies and its own arts, but science and engineering are building on them edifices far more towering than could be produced by earlier methods.

Many new fields of engineering are now just emerging from the shell. Plasma engineering is not yet hatched, but is pecking strongly. Stemming first from the work of the gas-discharge empiricists near the end of the last century, plasma theory was set on a firm scientific basis by the work of Langmuir less than 30 years ago. With the successful release of fusion energy in the hydrogen bomb it gives promise of making vast new reaches of energy available for the peaceful uses of mankind. When controlled fusion becomes commonplace there will be plasma engineers to nurture and develop it.

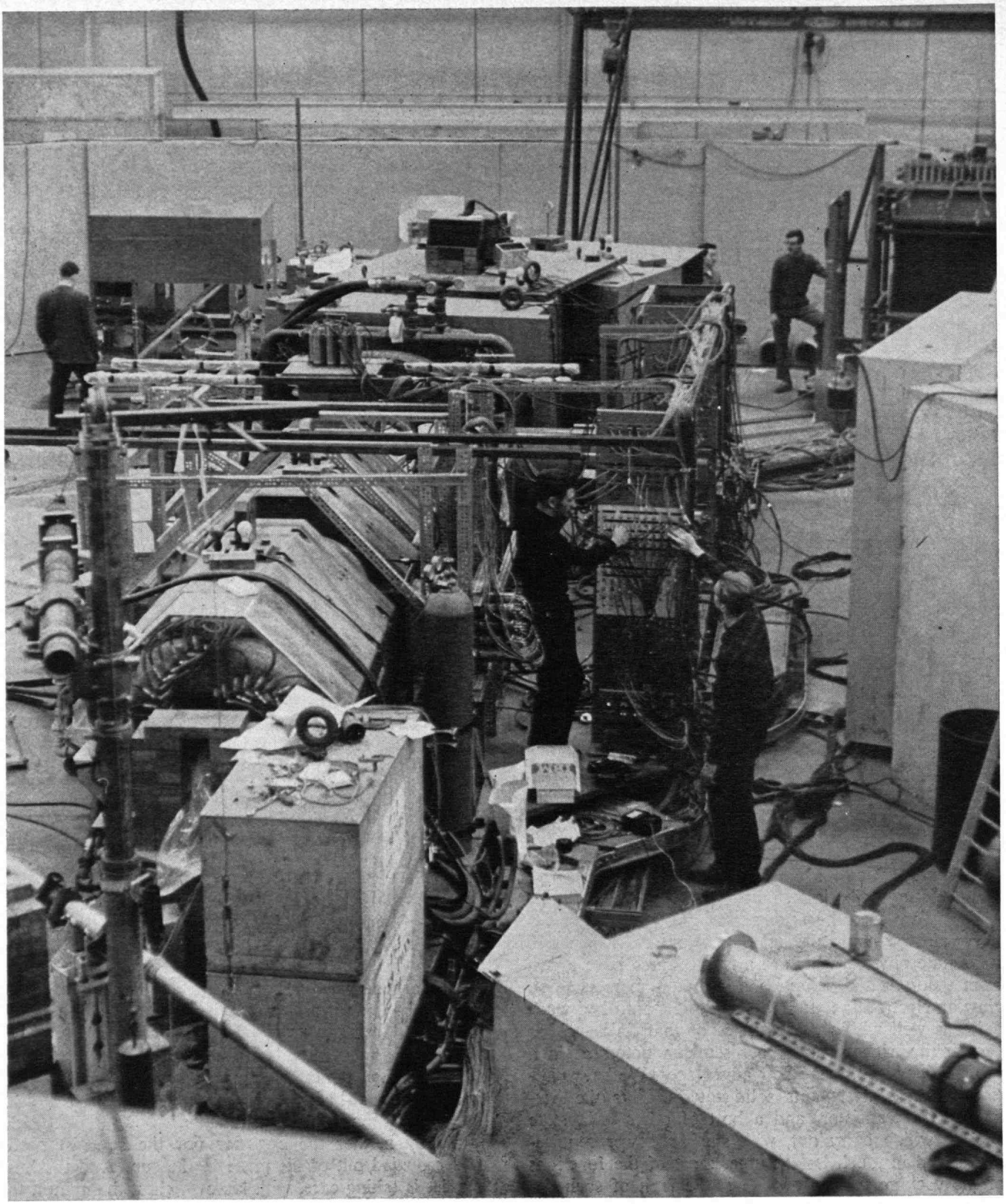
Similarly with maser and laser engineering, soon to proliferate widely after being brought to life by Townes in a premeditated scientific invention less than 10 years ago. Here the technology being built up is almost completely scientific in origin; requiring meticulous experimentation, it is far too complex for straight empiricism.

So the conclusion is fairly obvious. Technology and empirical invention have contributed much to the origins of engineering, but so has science. The newer the field of engineering, the smaller the relative contribution of the first two, and the greater that of the last. This trend is inevitable as the bases of engineering come to rest more and more on the inner depths of matter and energy, where only science brings the experience on which a technology can rest.

Our argument is not complete without mention of the great debt science owes to engineering. The cosmic-ray physicist depends greatly on balloons, rockets, airplanes, and satellites to carry his bubble chamber into exploration. The chemist needs new containers to hold his reacting materials at high pressures or at temperatures which have only recently become available.

Today neither the engineer nor the scientist need feel crowded out of his place in the sun. And the humanist is taking care, with his own chest-thumpings, to see that both remain humble.

At such institutions as M.I.T. science and engineering work hand in hand, as closely integrated as is possible without loss of individual identity. The faculties of the engineering departments are shot through with professors who were educated as scientists, and the science departments contain many former engineers. Only by the closest co-operation, now carried out increasingly in interdisciplinary laboratories, can the many new fields of engineering and of science which are destined to come to flower in the future be brought to life.



CALLED "MOBY DICK" *because of its bulk, this 40-foot long instrument is being used at the Cambridge Electron Accelerator. It consists of 120 tons of magnets on a movable platform. With its help an M.I.T. team headed by Associate Professor Louis S. Osborne, '50, is learning more about proton structure.*

Gamma rays from the accelerator are focused on a chamber containing protons. They give up pi mesons lasting two millionths of a second. In that period the mesons streak down the core of Moby Dick and some 150 scintillation counters record how their trajectories are bent by the magnetic field. A nearby computer analyzes the data as it comes from the apparatus.

Early Moby Dick experiments, with gamma rays of up to four billion electron volts, showed an increased tendency for protons to give up multiple instead of single pi-meson particles at higher energies. In further experiments gamma rays of even higher energies will be used. The Cambridge Electron Accelerator's rated peak is six billion electron volts.

The Soil Challenges M.I.T.

Civil engineers are using modern techniques to reduce the cost of solving foundation problems

BY T. WILLIAM LAMBE, '44
Professor of Civil Engineering

WHILE the intellectual foundation of M.I.T. is sound and firm, the soils underlying its campus are far from firm—in fact they are very soft. A sizable portion of the cost of new M.I.T. buildings goes into components below ground surface, a considerable part of the construction time is spent in work below the surface, and the size, shape, and type of each building depend on subsoil conditions.

The Department of Civil Engineering started a program known as FERMIT, "Foundation Evaluation and Research—M.I.T.," in 1962 to attack the foundation problem. Its staff is using principles of modern soil mechanics in an attempt to:

► ensure that future building foundations constructed on the campus will perform satisfactorily,

► reduce the chances of foundation construction damaging existing structures, and

► reduce the cost and construction delays associated with foundations.

Even though still in its initial stages, FERMIT has obtained enough subsoil, ground water, and building performance data to aid in the planning of the M.I.T. campus, and in the design and construction of new buildings.

A MEMBER *of M.I.T.'s teaching staff since 1945, Professor Lambe is an authority on the physical and chemical nature of soils, who has often been consulted by industrialists and government agencies both in this country and abroad. He has written numerous technical papers, and a textbook,* Soil Testing for Engineers.

Soft Soil

A soft soil has one or both of two characteristics: *low strength* and *high compressibility*. The motorist encounters low strength when he drives his automobile along a muddy road or through a sand dune. The wheels of the car sink into the ground, displacing soil to both sides of the ruts they form. The load that the wheels apply causes the shear strength of the soil to be exceeded and rupture takes place.

High compressibility is more usually associated with a volume change than with shear displacement. When you step in freshly fallen snow your foot sinks into the snow because of the volumetric compression of the snow. While there may be some shear displacements, the major part of the compression results from moving the snowflakes closer together.

Even though softness or weakness of a soil is somewhat related to composition (as with organic soils like peat) it depends primarily on *structure* and *water*. Structure is determined by the arrangement of individual soil particles and the nature of the forces acting between adjacent particles. Particles of clay are generally plate shaped and carry significant electrical charges on their edges and faces. A loose array of the clay particles, corresponding to a "house of cards" built by a child, occurs in "flocculated" soil. By reducing the forces of attraction between individual particles and applying mechanical work, one can arrange the clay particles into a parallel array just as the house of cards can be arranged in a neatly stacked deck. Flocculated soil can be very loose with a large capacity for compression, while an oriented, dispersed soil can be relatively dense with a low capacity for compression.

Water can have two deleterious effects on soil. Its mere presence causes the electrical forces between clay particles to decrease greatly. A sample of clay from below the M.I.T. buildings, for example, has a strength approaching that of weak concrete when it has been dried in an oven or in a hot sun. Placing such a dry piece of clay in water, however, makes it very weak. Water, in other words, is an essential ingredient of mud.

The pressure of moving water on soil can have a marked influence on its behavior. Water flowing upward in an unconfined cohesionless soil can exert a seepage force sufficiently great to float the soil particles. The soil then becomes "quick," i.e. it consists of particles floating in a liquid. Quicksand is thus a liquid having a unit weight about twice that of pure water. Quicksand does not have any suction associated with it; quite the contrary, it has an upward seepage force associated with it.*

Just as upward flowing water can reduce the strength of a soil, downward flowing water can greatly

*The cartoons, books, and movies (including *Lawrence of Arabia*) which involve quicksand sucking someone below its surface are pure nonsense.

strengthen it. Weakness or softness, in fact, depends on the *state* of a soil. Almost any soil can be very firm or very soft, or have any consistency between these extremes, depending upon *structure* and *water*.

M.I.T. Subsoils

The geologic column for the M.I.T. campus shows that the bedrock consists predominantly of shale but slate exists at some locations. Both the shale and the slate were formed in the Permian-Carboniferous geologic periods. The elevation of the rock surface varies considerably and the upper surface of the rock is usually weathered and quite soft. The glacial till which overlies the bedrock in the Boston area was laid down during the Boston substage of the Wisconsin glacier. The till is generally gray in color and consists of very dense gravelly sand or sandy gravel with 10 to 30 per cent by weight of fine particles. The thickness of the till varies from 0 to 15 feet over the campus.

The inorganic clay, known as the "Boston blue clay," was formed during the Boston substage of the Wisconsin glacier and is believed to have been transported by glacial streams and deposited in the quiet marine waters of the Boston Basin. It has a flocculated structure and is highly compressible. The upper part of the clay layer apparently has been partially desiccated during its geological history and is not as soft as the bottom of the layer.

A stratum of sand and gravel, which is an outwash deposit by glacial streams, lies on top of the Boston blue clay. The thickness of the sand-gravel stratum varies considerably over the M.I.T. campus from a few feet to more than 20 feet and can be extremely erratic both in thickness and in properties even within a small area because of the erosion which has taken place on its surface.

When the ice melted in post-glacial times, the sea level rose and the glacial deposits on the campus were submerged. A layer of organic silt was deposited on the campus, which was then part of the Charles River tidal basin. Deposits of peat were formed near the shore line of the basin. Since the shore line migrated with time, the distribution of peat on the campus is quite erratic. The thickness and nature of the organic silt-peat layer can vary considerably even over short distances.

Overlying the organic silt is man-made fill. The bottom part of this fill was obtained from the Charles River basin and, therefore, consists of the same material that directly overlies the sand-gravel stratum. This fill was dredged from the river bottom and pumped onto the campus in the 1890's. Miscellaneous fill at various times later was dumped on top of the hydraulic fill.

The fill and organic soils on the campus are so weak, so compressible, and so variable both in nature and thickness that they are not employed to support significant loads. The foundation problems thus arise from the great variability in thickness and properties of the strata underlying the organic silt and peat, and the high compressibility of the inorganic clay.

Construction over Soft Soil

On a site having soft subsoils, the engineer has a choice of one or a combination of four basic approaches: Ignore the problem, avoid it, improve the soil, or design the structure to withstand the effects of settlement.

By choice, ignorance, or necessity an engineer may ignore soft soil underlying his planned structure. Sometimes the consequences of this decision may be only inconvenience and/or high maintenance cost, but they can be catastropic. Parts of Venezuela along Lake Maracaibo have settled up to 15 feet, and this has necessitated the construction of facilities to keep the lake from encroaching on the land. In Mexico City, the Palace of Fine Arts has settled 14 feet, resulting in steps going down to the first floor where they used to go up to the first floor.

The original M.I.T. buildings constructed before the days of modern soil mechanics have undergone considerable settlement. A plot of the settlement of the main buildings as a function of time shows that the rate of settlement was much higher during the period immediately after construction than it is now. This initial high rate of settlement caused the newspapers of 30 years ago to predict with alarm that M.I.T. might ultimately settle out of sight.

Many of the large shopping centers being constructed around metropolitan areas today are going on sites which were avoided in earlier years, and many of these centers are experiencing settlement trouble. If the layer of soft soil is not too thick, it can be removed and replaced with better material. This is a common construction technique on highways where topsoils or other soft materials are removed and replaced with bank-run gravel.

A second approach under the category of "avoid" is to design a foundation scheme that keeps the load applied to the soft clay tolerable. The load on the soft clay can even be kept to zero. This technique of avoiding loading the soft clay has been widely applied on the M.I.T. campus, and examples will be discussed later.

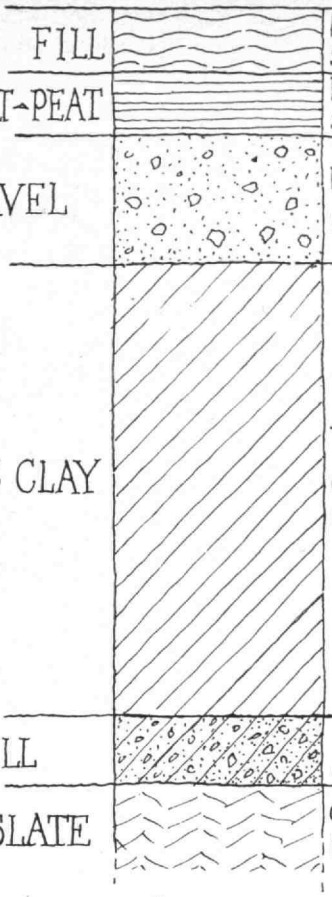
Under certain conditions a soft soil can economically be improved to the point that it will carry the load desired. In road construction, for example, an additive such as portland cement, lime, asphalt, or other material can make certain soft soils acceptable for pavement subgrades and bases. Another technique which has been used with great success is "preloading," to compress soft soils, but this requires time which is usually not available.

There are also various techniques whereby the engineer can design his structure to withstand the damaging effects of settlement, especially differential settlement. Yankee Stadium was built on a network of jacks and as it settled the jacks were raised in such a way that the stadium was maintained in a level position and Babe Ruth's fans never knew any settlement was occurring. After the most of the settlement had occurred, the jacks were concreted over and today's baseball fan does not even know they exist.

Pile Foundation

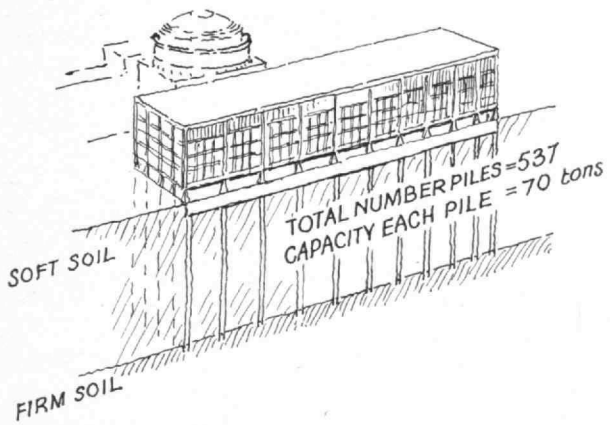
The new M.I.T. Earth Sciences Building and the new Materials Science and Engineering Building are supported on piles which carry the building loads through the soft clay to the firm till and/or rock below the clay. As shown in the drawing on page 21, the weight of the Materials Building plus the equipment, books,

GEOLOGIC COLUMN – MIT CAMPUS



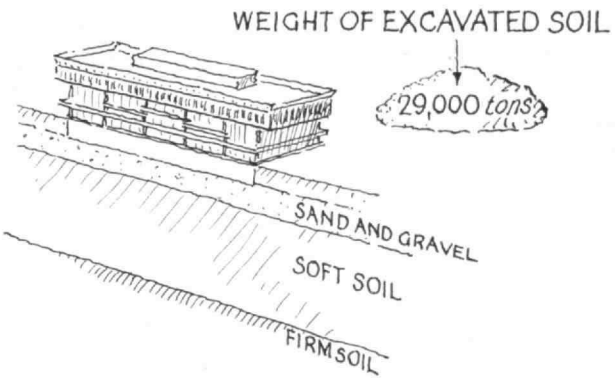
FILL	Mostly hydraulic but some dumped fill. Fill consists of sand, organic silt, shells, bricks, stones, etc.
ORGANIC SILT-PEAT	Former mud flats and river bottom containing sand, silt, peat and shells
SAND-GRAVEL	Relative proportions of sand and gravel vary widely: generally very little silt or clay materials
INORGANIC CLAY	The top few feet may be stiff. Contains lenses of sand and silt, and occasional boulders. Commonly called "Boston blue clay"
GLACIAL TILL	Heterogeneous mixture of gravel, sand, silt and clay; usually very dense
SHALE OR SLATE	Often quite weathered and/or fractured near upper surface

MATERIALS BUILDING



WEIGHT OF BUILDING = 15,650 *tons*
WEIGHT OF EQUIPMENT, BOOKS, PEOPLE, ETC. = 12,200 *tons*
MAXIMUM TOTAL WEIGHT ≈ 28,000 *tons*

STUDENT CENTER



WEIGHT OF BUILDING = 32,000 *tons*
WEIGHT OF FURNITURE, PEOPLE, ETC. (time average) = 5,000 *tons*
37,000 *tons*
WEIGHT OF EXCAVATED SOIL = 29,000 *tons*
NET LOAD TO CLAY = 8,000 *tons*

people, etc., is approximately 28,000 tons. This total load will be carried by cast-in-place piles about 110 feet long. Each pile consists of a ¼-inch-thick steel shell, 12¾ inches in outside diameter, filled with concrete after being driven. Each pile is capable of supporting a load of 70 tons.

Because of the very close proximity of Building 10 to the new Materials Center, extreme precautions were taken not to disturb the foundation of the existing building. Even so, large pore water pressures developed under Building 10 during the pile driving and it first heaved, somewhat less than a half inch, then settled. This disturbance of Building 10 and other adjacent buildings was due to the lateral displacement of soft clay by the Materials Building piles.

Several of the new M.I.T. buildings have "floating foundations." In this scheme the net load applied to the soft clay is reduced by excavating soil to compensate for the weight of the building. As illustrated on page 21, the weight of the Student Center plus a time average value for the weight of furniture, people, etc., is about 37,000 tons. The Student Center was placed in a hole made by removing about 29,000 tons of earth. Thus the net load to the soft clay was equal to the difference of these two values, i.e. about 8,000 tons. Thus the settlement of the Student Center will not be the 10 inches or more which would have occurred had flotation not been used, but rather two to three inches, a value which is tolerable. In anticipation of this settlement, the Student Center is founded on a very thick mat of reinforced concrete.

The principle of flotation is the same as that involved with a boat in water. The weight of the building plus live load divided by the total volume of the Student Center is about 35 pounds/cubic foot. Since this is about half the unit weight of water, the Student Center (if it were watertight) would float in water with about half of its height above the water level. Since soil has about twice the unit weight of water, the Student Center could be fully floated with about three-quarters of its height above ground level. If it were floated to this height, the net load in the soft clay from the weight of the building would be essentially zero, and thus compression of this clay would be insignificant. Since the net load in the soft clay at the Student Center is not quite zero, "partial" rather than "full" flotation is being employed. At the new Life Sciences Building full flotation is being used.

The choice of foundation for a given building and site depends very much on the nature of the site and the particular building at hand. Obviously, the flotation scheme yields a large volume of building space below ground level which may or may not be desirable depending upon the intended use of the building.

The civil engineer specializing in soil mechanics is concerned both with founding structures on soil and building structures through and out of soil. Study in the laboratory and in the field, including the research on the M.I.T. campus, is hopefully contributing to better and cheaper solutions to these problems. The prime purpose of the study of soil conditions on the campus is to help M.I.T. with its own foundation problems. A desirable by-product of this work is the training of students and contributing, in at least a small way, to the solution of soil problems being faced in many parts of the world.

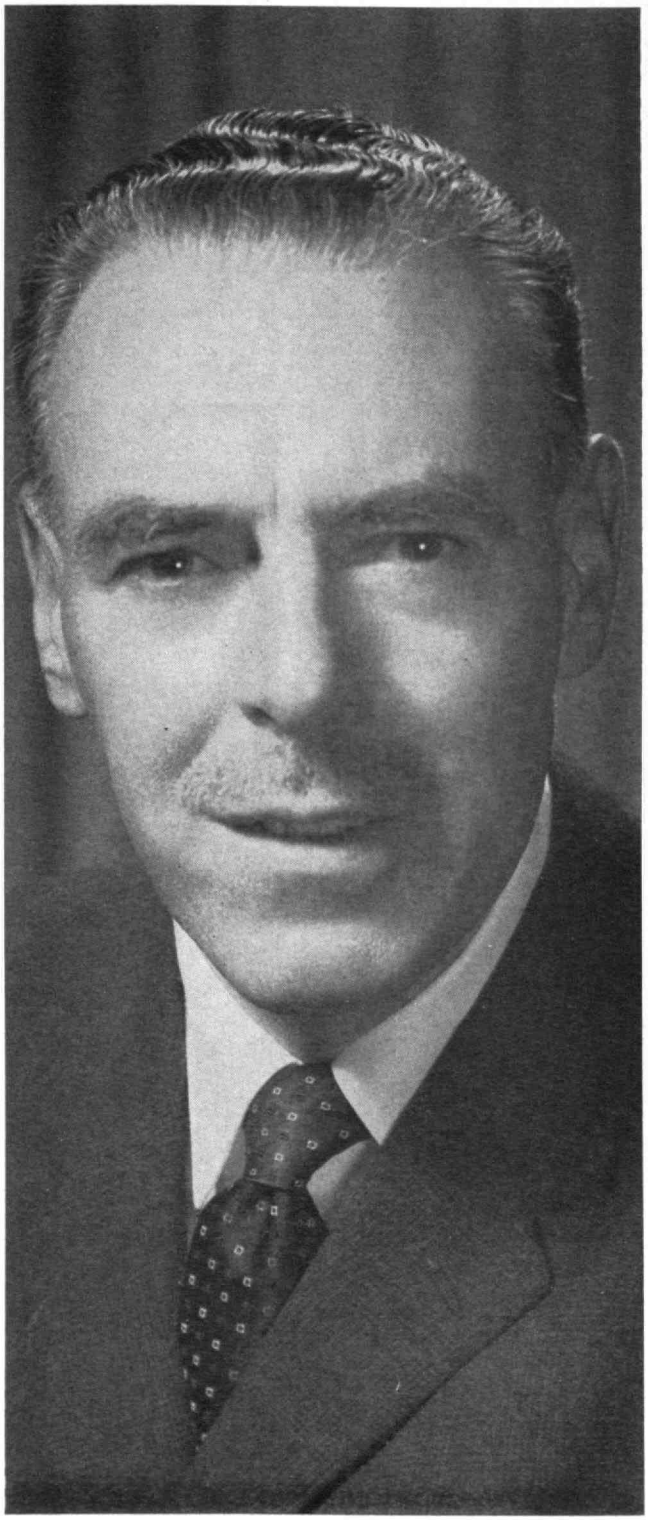
Skidmore, Owings, and Merrill Photo

This photograph of the Materials Building in the early stages of construction shows a supply of the steel shells used (in middle) and the driving of a pile right next to Building 10, in what was formerly M.I.T.'s main parking lot.

Students, Materials, and Science

The British physicist who heads M.I.T.'s new interdisciplinary center chats a bit about it

BY DAN PINCK



ROBERT A. SMITH (at right) came to M.I.T. from the United Kingdom to head the new Center for Materials Science and Engineering, for which a new home is now being built in what was formerly the Institute's main parking lot. During World War II, Professor Smith was one of the British scientists who worked closely with the American researchers in the M.I.T. Radiation Laboratory.

After recalling that unprecedented venture in this tape-recorded interview, he went on to discuss higher education both in England and America, and the new center's role.

Interviewer: *Was there anything like the M.I.T. Radiation Laboratory in England?*

Professor Smith: There was a very similar setup in England. It was known as the Telecommunications Research Establishment, generally contracted to TRE. The establishment still exists, but it goes under another name now. It's called RRE—the Royal Radar Establishment. At TRE during the war there was a very remarkable collection of people. We had, of course, a preponderance of physicists, but we had biologists, chemists, even historians who learned electronics, and an eminent zoologist. And this was a remarkable mixture of people with very different backgrounds, which was welded together into an extremely effective team.

Q. *You worked with Lord Rutherford before the war . . . if the war had not come along, would your research have followed the same path?*

A. No. I think that for many of us the war changed our outlook on physics. It's difficult to say now what I might have done if the war hadn't come along.

One got a very good training in physics, and a broad outlook on physics, working with Rutherford in the Cavendish. At that time, although the Cavendish was concentrating its efforts in nuclear physics, there were many other things going on, and we were encouraged to look at physics as a whole. The training in physics stood us all in very good stead when the war came.

I personally had some experience in electronics before the war started, partly through an interest in amateur radio, but also in making scalers and counters in the Cavendish Laboratory. Many of my colleagues did not have any form of training in electronics, but they took to it very fast; they realized that electronics was physics, or applied physics, and if you've had a training

in basic physics, you can turn your mind to most other problems in science.

I'm a strong believer in the theory that it's very good for all physicists to have a complete change of work at some time in their careers. I think it's bad for a man to grow up in just one area of physics. My own interests now, for example, are very much concentrated in physics of solids, what we call here at M.I.T. materials science, so in a sense I've been in atomic physics, then I've been in electronics, and now in solid state; and I've never regretted having had a wide experience in all of those. I don't think one ought to change one's field too often, but I think it's good to change it occasionally.

Q. *Have you noticed any undue emphasis on specialization since you've come to the Institute?*

A. I feel that the danger of extreme specialization in a place like M.I.T. is very much less than in a smaller university or institute because there's just so much going on at M.I.T. in so many areas that graduate students have an excellent chance to know about fields other than their own. If they don't, it's their own fault. Moreover, now that I've become more familiar with the American graduate student educational system, in which set courses are required to be taken and passed, I see that a graduate student does get a chance to have lectures and discussions in different areas, and, in fact, he's pretty well required to do so.

In many of the British universities, particularly the smaller universities, a graduate student gets no formal instruction at all, and the tendency to become extremely narrow under these circumstances is very great. It's one of the problems with which graduate schools in British universities are faced. . . . Many of the Ph.D.'s we used to recruit when I worked at the Radar Establishment were perfectly good specialists in a particular area, a rather narrow area, but didn't have either the wide outlook or the wide knowledge of modern physics that you have to have if you get into a practical job.

Q. *Can you cultivate this attitude, this wide outlook, in undergraduates?*

A. I think it begins in undergraduate training, but I don't think it can stop there; I think it has to be continued during the graduate student period. Naturally, of course, a graduate student has got to get down to doing a research job in a specialized subject. This nobody would deny, and I think that maybe in some places over here there is the opposite pitfall of a man not really having learned when he takes his Ph.D. to stand on his own two feet and do a solid research job himself. This is absolutely essential. You must do this *once successfully* to prove both to yourself and to other people that you have the ability to carry out a piece of independent research.

Q. *How did you decide what research and which laboratories would be attached to the Center for Materials Science?*

A. This is a very complex situation, but I think there are one or two general principles.

An important need these days is for facilities for the preparation of materials under extremely pure conditions, with not only their purity controlled, but their structure controlled, and the basis of doing this is an understanding of the physics of the formation of solids, the physics of crystal growth, the physics of inclusion of imperfections and impurities into solid materials. There are various basic things that one must have in order to evaluate what you have made when you've got a new material.

Now, one looked around and saw some of the people who were developing new approaches to this problem. One is always interested in looking at materials under extreme conditions, and one extreme is very low temperatures. You can find out a lot of things about materials by examining them at very low temperatures. So it was very natural to include a low-temperature group.

Then there's the recent development of resonance techniques, both nuclear resonance and electron spin. . . . The resonance techniques give one a very powerful tool for looking at localized impurities and localized centers in materials and finding out about the very basic structure. So naturally one would want to include a resonance group. Then theory, of course, plays a predominant part, so naturally, you have solid state theoreticians.

Then you look at the basic problems of crystal growth, and you decide that you must have a strong crystal growth facility—people who are interested not just in growing crystals but in understanding how crystals grow. I've been talking very largely about the physics and chemistry side. On the chemistry side, you have to have the most advanced analytical techniques.

Then you look at the problem of mechanical properties of materials which, after all, is one of the most important features, and, so you naturally turn to metallurgy and look for people who are interested in special techniques associated with new and interesting kinds of materials. One new and interesting kind of material is the high field of superconductors, still another field is semiconductors. The latter happens to be my own particular field of interest, so naturally I wanted to include a semiconductor physics research group.

Then you have x-ray analysis, optical spectroscopy, and infrared spectroscopy, another very powerful tool of understanding the basic properties of solids, and you build up this way.

Then you look for user aspects. The electronics industry has been one of the very large users of new material developments. Everybody knows, of course, about the transistor and the solid-state electronic devices that are becoming so common now. So you naturally include some people with electronics interests, who are interested in the *use* of these new materials, and so on . . . and it builds up and grows as you work along, the basic principle being finding areas that kind of cling together to form a cohesive whole. You try to give the laboratory some kind of aim, shall I say, and then you look for able people in these areas, and it builds up that way. But it's an organism, you see, it's a thing that grows on you: you start with a baby and before you know where you are you've got a strong, thriving child that you have to keep in check sometimes.

Q. *Where does the engineer come in?*

A. The engineer comes in, of course, in the user aspect, in the development of materials for specific purposes. Just to cite an example, high-speed transonic flight, and space projects, require materials that will retain their mechanical properties even when they are at very high temperatures. Now the normal steels and light alloys soften or even melt when you get to these high temperatures. So there's a very great interest at the moment in developing new materials that will stand up to these rather severe environmental conditions, particularly conditions of high thermal shock. It's not only that they get hot quickly—they get cold equally quickly. This can play havoc with many materials.

Q. *With so much support from the Advanced Research Projects Agency, will most of the work in your center be directed to the defense effort?*

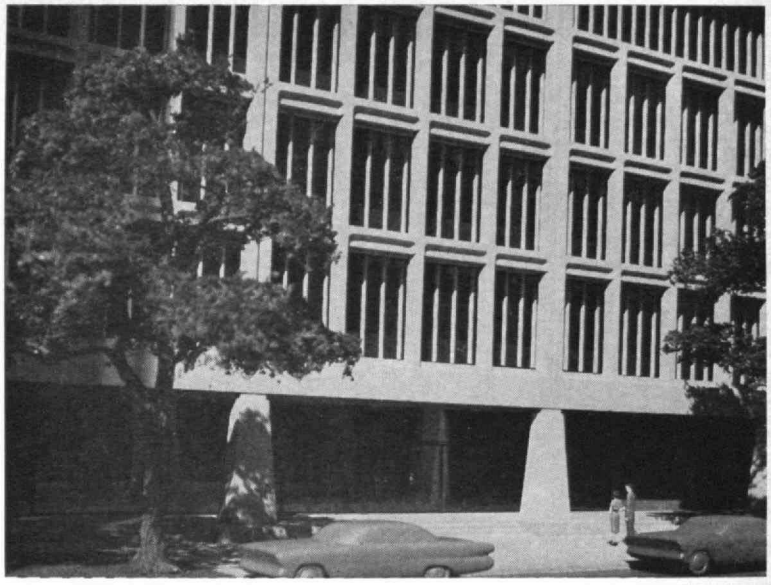
A. I think one has to, in a sense, be sure what one really means by the Materials Center for Science and Engineering. In its widest aspects, this encompasses all the research on materials science and engineering at M.I.T. The center is a sort of focal point for this. Much of this, of course, is not supported by ARPA; it is supported by a very wide variety of agencies and foundations.

But then one thinks about the new interdisciplinary laboratory, which is being built as part of the center. And one mustn't, although one tends to do so sometimes, identify the Materials Center with the new interdisciplinary laboratory. A large part, of course, of the funds for the construction and equipping of the interdisciplinary laboratory comes from ARPA and my guess is at the moment that about half of the work actually done in the laboratory will be supported by ARPA funds. But there will, of course, be people working in the laboratory who have support from other sources, such as the National Science Foundation, and other agencies such as the Office of Naval Research, Atomic Energy Commission, National Institutes of Health, just to give some examples.

Q. *How will M.I.T.'s Center for Materials Science work in conjunction with the similar centers at other universities?*

A. Communications is always a difficult problem and I don't think it's humanly possible to be in intimate communication with all the materials centers being supported by ARPA, but there are a number that we have very natural close contact with. I'm, in fact, in quite close contact with Cornell, University of Illinois, University of Pennyslvania, a group at Northwestern University, and others. But, of course, these centers, just like our own center, do produce each year a fairly comprehensive report on all their activities and we get copies of all these and one can read at least what's going on. Moreover, ARPA arranges a meeting once or twice a year at one or another of the centers to which the directors of all these centers are invited, and most of us try to attend.

Q. *There are young men who come to M.I.T. and from the day they enter as freshmen they want to be metallurgists—is it possible for more than a fraction of very bright young men who come here to base their decision on a sufficient knowledge of the profession?*



A preview from a model of the building being erected for Materials Science and Engineering at the Institute.

A. That's a difficult question. I think I'm bound to say that only a small fraction of those who come in would have adequate knowledge at that stage to decide what they wanted to be. On the other hand, it's curious how boys at school do seem to make up their minds. I never had any doubt myself—I wanted to be a physicist, although I was taught very little physics at school. My knowledge of physics when I went to the university was most rudimentary, but I still knew I wanted to be a physicist.

I think it's important that this decision, after it has already been made on the part of a young man, should not have any significant influence on his undergraduate education. Undergraduate education, I think, should be broadly based scientifically and the time really to begin to specialize is, well, certainly not before one's final two undergraduate years. The first two years in school one ought to have a pretty open mind, and one ought to take subjects that will qualify one to go into any of the major areas.

Q. *There are some men here who fear that these research centers are going to dilute the strength of the individual departments.*

A. I know! When I came to M.I.T. a lot of people talked to me about this and were very anxious to convince me that nothing I did must detract from the standing of the departments. I recognized very soon that this was due to a fear that the interdisciplinary laboratories would take research away from the departments. Being new to M.I.T., maybe I don't see it as strongly as people who've been in the departments a long time. I've not really seen the reason, or a just reason, for this fear. I don't believe that the interdisciplinary centers, provided their directors are co-operative with the departments, can do anything but strengthen the departments.

(Concluded on page 44)

New Books

GOD AND GOLEM, INC., A Comment on Certain Points where Cybernetics Impinges on Religion, by Norbert Wiener *(The M.I.T. Press, $2.95).*

RABBI LOW of Prague persuaded the Emperor Rudolf that his incantations blew the breath of life into the Golem of clay. The machine is the modern counterpart of that clay, Norbert Wiener feared; and *God and Golem, Inc.*, a book based on lectures he gave in 1962 at Yale and in Paris, is a warning against moral traps.

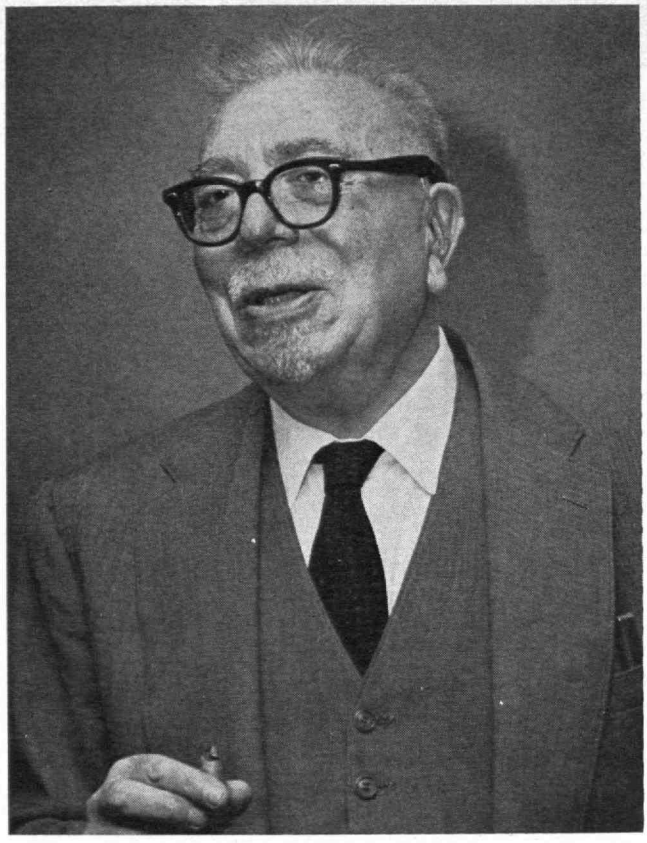
Our approach to both religion and to science, he believed, is encumbered too often by prejudices. It is as emotionally disturbing to our generation to speak similarly of men and machines as it was to our predecessors to behold human beings linked with apes. Yet we now have machines that learn, a property once attributed exclusively to self-conscious systems. Machines also can make machines in their own image. Men have arrogated to themselves "the function of a limited creator," and a real conflict is developing that is analogous to that between God and the Devil, one of His creatures.

Two sins, sorcery and simony, Professor Wiener declared, tempt us in this new guise. "If but two hundred years ago a scholar had pretended to make machines that should learn to play games or that should propagate themselves," we are reminded, "he would surely have been made to assume the sanbenito, the gown worn by victims of the Inquisition." And today? "If an inventor should prove to a computing-machine company that his magic could be of service to them, he could cast black spells from now till doomsday, without the least personal risk."

The study and production of automata is, of course, a legitimate human exercise, but this book emphasizes that there are "aspects of the motives to automatization that go beyond legitimate curiosity and are sinful . . .

"For whether we believe or not in God and his greater glory, not all things are equally permitted to us. The late Mr. Adolf Hitler to the contrary, we have not yet arrived at that pinnacle of sublime moral indifference which puts us beyond Good and Evil. And just so long as we retain one trace of ethical discrimination, the use of great powers for base purposes will constitute the full moral equivalent of Sorcery and Simony."

The gadget-minded people among us now, Professor Wiener continued, "often have the illusion that a highly automatized world will make smaller claims on human ingenuity than does the present one and will take over from us our need for difficult thinking, as a Roman slave who was also a Greek philosopher might have done for his master. This is palpably false. A goal-seeking mechanism will not necessarily seek *our* goals unless we design it for that purpose, and in that designing we must foresee all steps of the process for which it is designed, instead of exercising a tentative foresight which goes up to a certain point, and can be continued from that point as new difficulties arise. The penalties for errors of foresight, great as they are now, will be enormously increased as automatization comes into its full use."



Institute Professor Wiener lecturing at M.I.T. in the '60's.

Again, as he had before, Professor Wiener tells the story of the Monkey's Paw, and he predicts: "The world of the future will be an ever more demanding struggle against the limitations of our intelligence."

Those who enjoyed Professor Wiener's company will recall his remarks when they read this book. He notes, for instance, that machines have taken the challenge out of checkers as a game; chess, too, is doomed, but other games (such as Go) still will be enticing to engineers. He speaks of toying with the idea that it is conceptually possible to send a human being over a telegraph line. He charges that social scientists, in "dressing up their rather imprecise ideas in the language of the infinitesimal calculus," have shown "scarcely more discrimination than some of the emerging African nations in the assertion of their rights." And he recommends that the ideas of cybernetics be tested in engineering and biology before they are applied to such "formless" fields as sociology and economics.

Many passages in this book's 95 pages will make some readers bristle, which brings to mind an incident remembered by the author's friend, Vannevar Bush, '16. Once when Professor Wiener was very annoyed with another mathematician, he wrote the man a letter, which he showed to Dr. Bush.

"That's a very clever letter," Dr. Bush commented, and Professor Wiener put it back into his pocket. But he brought the subject up again later.

"Would you send that letter if you were me?" he asked. "If I were you," Dr. Bush replied, "I'd show that letter to my wife, and if she said send it, I would."

Professor Wiener, without a word, tore the letter up and tossed it into the fireplace.

(Book News is concluded on page 42)

The Sailing Champion M.I.T. Men Watch

An account of a sport both undergraduates and Alumni enjoy . . . and a coach who will be the title-defender next fall

BY GEORGE W. SMITH, '26

SAILING became a sport at the Institute after many of us were graduated. Professor Erwin H. Schell, '12 (a non-sailor), had been looking at the vacant Charles River for many years, reflecting how nice it would be to have boats sailing out there. He spoke to Professor George Owen, '94, about designing an M.I.T. sailing dinghy for use on the Charles and Professor Owen agreed to design the boats if Professor Schell would find the money for building them. This is exactly what happened. Professor Schell found Alumni who were interested in establishing sailing at M.I.T. and money was raised for the boats and Sailing Pavilion while Professor Owen designed the Tech Dinghy.

The Sailing Pavilion was built across from Walker and then the problem of organizing and running it became apparent. Professor Owen prevailed upon Walter C. "Jack" Wood, '17, to take on this responsibility as sailing master and in 1935 things got underway. Under Jack's guiding hand it has become an important participating sport at M.I.T.

I have always regretted that sailing was not a sport during our years at the Institute because it was not until 1951 that I made a serious attempt at learning to sail. I quickly found yacht racing to be a most satisfying competitive sport and the only one that ever held my interest. A sailing boat is a graceful, clean thing of beauty and "out there" you are away from it all. Making a boat go in a race is a complicated, fascinating activity that allows competition for everyone. Even the last boat (mine) is always desperately trying to keep from being last and always has a chance by observing wind shifts and tides of becoming first.

I quickly found that the real competition at Rockport was in the Star Class and in late 1953 found an M.I.T. student (Art Herrington, '52) who wished to sell his "cream puff" racing Star. I then became the proud owner. Somehow, about as quickly, I became chairman of the 1954 North American Star Championships that were held at Rockport. This event catapulted our local Cape Ann Star fleet into competition we never knew existed and ever since it has been way over my head.

A Champion's Debut

While we were preparing for the big race a lady showed up at the club one day and announced herself as Joe Duplin's mother. That meant absolutely nothing to me, or anyone else, but she explained that he sailed a Star boat in Boston Harbor called "Black Magic." The next we heard of Joe was in 1956 when his mother, who had great confidence in his sailing ability, bought him a new Star boat from the best builder in the world. (The Russians obtained a similar boat from the same American builder and with it won the 1960 Olympics.) Joe quickly justified the purchase by winning the Atlantic Coast Championship that year, but in big league, the North Americans, he turned up 28th.

About that time Uncle Sam began to breathe on Joe's neck and he joined the Navy. I never learned how it happened but Joe was assigned to Annapolis to work on their fleet of yachts. What's more the Navy recognized his sailing ability and allowed him to keep his Star and race it. In the fall of 1957 the world championship was held in Havana just before Castro took over and Joe, with a Navy officer as crew, took a third and shortly thereafter sold his boat. Upon getting out of the Navy, Joe decided to build Star boats but the odd-looking boat he and a partner turned out was quickly disqualified when Joe showed up with it in 1960 for the Atlantic Coast Championships at Rockport. I offered my boat to Joe but he was able to borrow one he liked better and he raced it to win with four firsts and one second.

(I eventually bought that boat, too, but I went no faster.)

With a new wife, Joe had to eat, and he became a salesman for Blue Cross. All the while, however, "Jack" Wood had his eye on him as a possible sailing coach for M.I.T. It didn't take much selling to get Joe "working" at what he loves most and he joined the M.I.T. coaching staff in late 1960.

Coach Joe Duplin with the plaque naming him the world champion in the American Star Class.

AS SECRETARY *of his M.I.T. Class, George W. Smith often has written of the joys of life at Pigeon Cove. Here he reveals one of the reasons.*

For a year or so Joe was without a boat, then he got the idea that a California boatbuilder had just what he needed. Joe ordered one, much to the dismay of all of his friends, who felt the boat was too light and that it would not stand up. Joe showed up with it at Rockport last July for an invitation series. When a two-foot split developed in the bottom everyone nodded heads—the boat was too flimsy. Joe put Scotch tape over the crack to finish the series and strengthened the bottom later.

His 1963 Victories

His greatest ability in racing has always been demonstrated when the wind blows hard and he is able to drape his 220 pounds farther over the side than anyone else and thereby sail the boat more nearly upright and faster. Consequently when the North American championships were held at Rye last August in very light Long Island Sound winds everyone felt for Joe—but not for long. To quote from The New York *Times* of August 26, 1963: "Joe Duplin, a 29-year-old member of the Massachusetts Institute of Technology's Physical Education Department, stepped away from the rest of the aspirants as if they were tied to the dock." This was the *Times'* statement at the end of the first race and the same was true at the end of the series which Joe won.

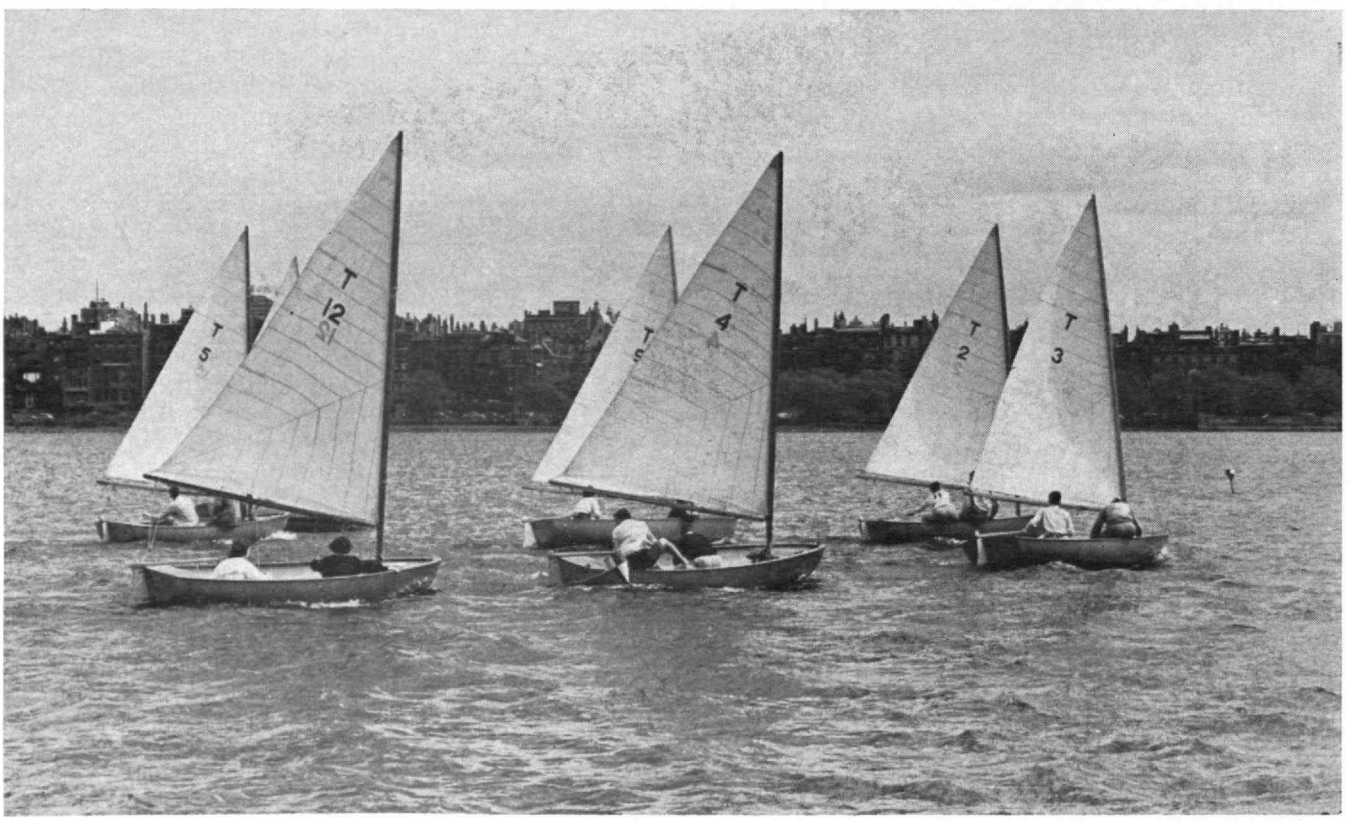
It happened that the world's championship was also in the U.S.A. in 1963, at Chicago, and Joe entered this series, too—and won. The 69 world championship contestants included the best sailors from this country, Europe, South America, and an entrant from Russia who came with his staff including a manager and a political adviser. It was a grueling race but Joe had enough extra speed so that he could be cautious at marks and keep out of jams that had previously brought his downfall.

At the New York Yacht Club this spring, Joe received the Martini and Rossi award for 1963, for having won both the World and the North American Championships within three weeks.

It has been most interesting to me as a Johnny come lately in sailing to watch this young man soar to the top in about the same length of time I have been scraping around on the bottom. It has also been satisfying to see an athlete connected with M.I.T. reach these heights. In New England the sailing season is short and a few years ago all the Star champions came from year-round sailing locations, such as Naples, Lisbon, Havana, and San Diego.

Having sailed with Joe Duplin I began to realize that he possessed a talent that is common to a virtuoso in any field. He feels something in a boat that I am completely unaware of and he tunes his boat like Heifetz tunes his violin. Becoming World Champion in the Star class is an achievement recognized by sailors the world over but it gains little notice beyond the sailing fraternity. That is why I wanted you to know about Joe Duplin and to drop in at the Sailing Pavilion and meet him when you are in Cambridge for Alumni Day. Also when he is defending his title in Boston Harbor August 29 to September 3, 1964, you will want to watch the newspapers to see how our boy is doing.

Sailing is a wonderful sport for M.I.T. and for Alumni. I hope if you have never tried it you will give it some serious thought. I once read that if one has difficulty getting to sleep at night he should turn his thoughts to something pleasant. I always dream that I am at the helm of a white Star boat sailing smoothly in a light breeze in brilliant sunshine. If you haven't had the experience, won't you "come aboard"?



Human and other control systems work together on the Charles. Come aboard, says Mr. Smith, if you haven't already tried it.

Trend Of Affairs

Another Kind of Fallout

NORTHERNERS as well as southerners favored disfranchisement of inhabitants of this country's new possessions in the Pacific at the turn of the century, and this encouraged the Southern states to deny the right to vote to the Negro. Now the whole nation is suffering from the fallout from the decisions made then, Ralph McGill, publisher of The Atlanta *Constitution,* contended in the third annual Abramowitz Memorial Lecture sponsored by the M.I.T. Department of Humanities this spring.

"The acceptance of a system immoral and expensive in human and economic terms," he said, "made inevitable a lack of first-rate educational opportunity for the average Southerner. It doomed most of the people of the rural South to an existence so meager and unrewarding as to bring on, and yet be unable to sustain, the Populist revolution. The sharecropper tenant statistics of the 1930's revealed how great has been the cost in things temporal and spiritual.

"That cost continues. In my opinion it will be paid over and over for at least a generation to come and it is perhaps fitting that it must be borne nationally. But the South, inevitably, will pay the higher share."

Migration out of the South has been largely responsible for the slum ghettos of poverty and color in the large Eastern cities, he continued. "These slums are not stopping places as they were in the old days when the great waves of immigration came to America. Few persons are leaving those of our time. They grow, glacier-like. And they fester."

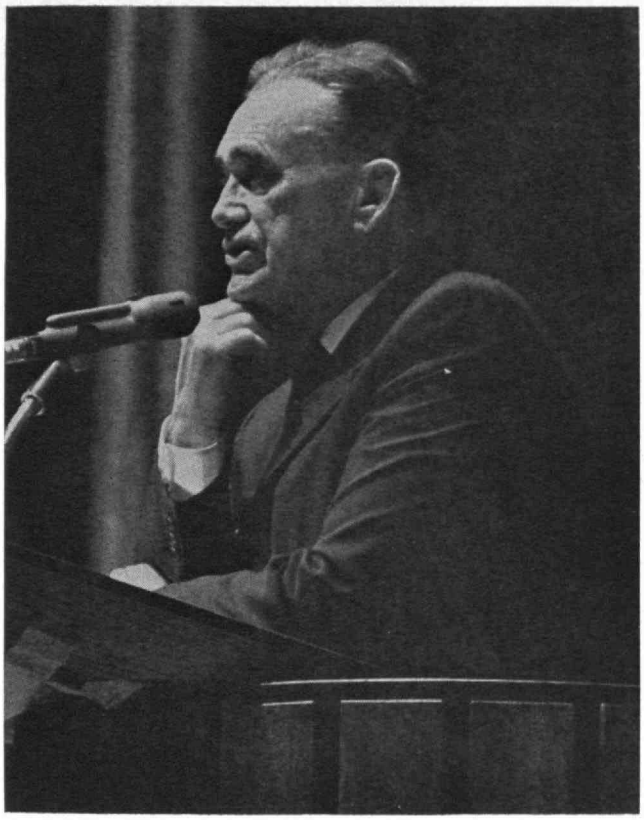
Mr. McGill's lecture was given shortly before the civil rights filibustering formally began in the Senate, and he declared that the controversial public accommodations section of the bill was especially needed.

But that bill, he concluded, "can be nothing more than a beginning—a legal pivot toward equality in education, politics, housing, and jobs. The vote and education will be the more powerful tools. . . .

"Individual rights cannot be compromised out of existence. The filibusterers would do well to understand that basic fact. It ought to be a relatively simple task for some 172 million Americans to do what is right. That it isn't possible to move steadily toward this objective is an indictment that will not be nol-prossed for a long time to come."

The Entrepreneurial Spirit

THE Olivetti Foundation established in 1957 by Dino Olivetti, '40, has made a two-year grant of $100,000 to the Joint Center for Urban Studies of M.I.T. and Harvard for basic research on problems of urban and regional development. The first study under the new program will be of the development of the "entrepreneurial spirit" among the middle class of several cities, and will be conducted by Professor Arthur Stinchombe, a sociologist now at Johns Hopkins University.



Ralph McGill, the noted Southern writer and publisher, delivering the Abramowitz lecture in Kresge Auditorium.

A President Kennedy Memorial

IN MEMORY of President Kennedy, the British government proposes to give "an acre of Runnymede laid out simply with a simple plinth and steps" to the United States in perpetuity, and establish "a Scholarship Fund for young men and women from the United Kingdom to go as undergraduates or graduates, some to Harvard University or Radcliffe College, some to the Massachusetts Institute of Technology."

The Right Honourable Sir Alec Douglas-Home announced this plan in the House of Commons on March 25 and reported that the Leader of the Opposition and the Leader of the Liberal Party had agreed to it, and that the Lord Mayor of London would make such a memorial the object of a Lord Mayor's Appeal.

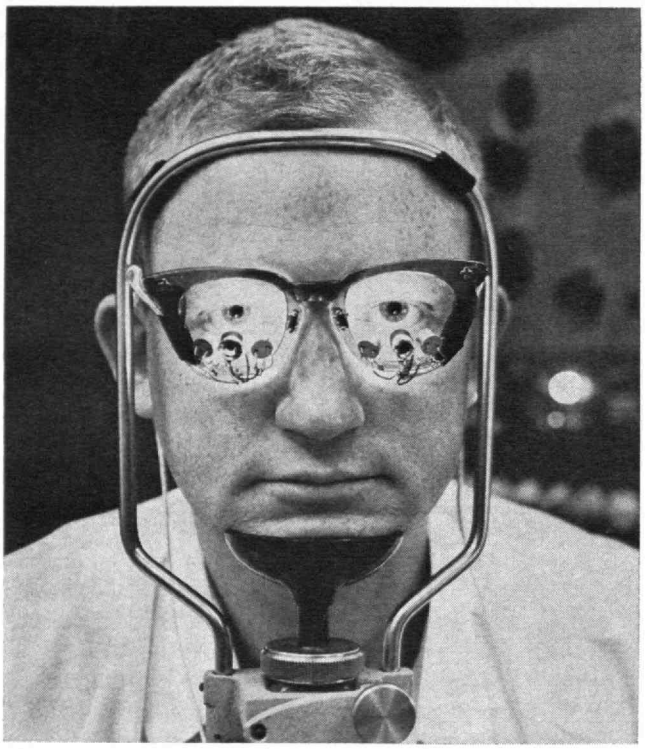
An Earth Sciences Conference

M.I.T. will be host to geologists, geochemists, meteorologists, and oceanographers from all over the world next September 30 to October 2, when the new 20-story Green Building is dedicated as the home of the Center for Earth Sciences. Roger Revelle, Director of the Scripps Institution of Oceanography, will be the principal speaker at the dedication on Friday, October 2, and Mr. and Mrs. Cecil H. Green of Dallas, Texas, the donors of the building, will be present.

Sessions of the international scientific conference preceding the dedication will be devoted to the earth's environment, atmospheric motions, the dynamics of oceans, and the "solid earth."

Computer-Aided Hospitals

SUCH medical terms as *nystagmus* (a constant, involuntary rhythmic tremor of the eye), *clonus* (a shaking of the wrist), and *hippus* (a rapid contraction and dilation of the pupils) describe what engineers call *oscillations*. A neurological system such as that of the pupil of the human eye can be considered as a servomechanism, or automatic control system distinguished by a feed-back pathway. Stability is a fundamental property of a servomechanism that is closely related to all of its elements, and a breakdown of the system sometimes cannot be attributed to any one of its components. Characteristically, the failure of an unstable



Photocell goggles and other special equipment connected to an M.I.T. computer yield diagnostic information.

system shows up as sustained or increasing oscillations.

This approach to neurological and biological systems is being followed by Drs. Lawrence Stark and James F. Dickson in the M.I.T. Electronic Systems Laboratory. As part of these studies remote on-line computer connections now have been made with diagnostic laboratories of Boston hospitals.

In the Howe Laboratories of the Massachusetts Eye and Ear Infirmary, in Boston, a pupillometer apparatus and special glasses for measuring eye movement are connected by telephone lines—running about one mile—to the GE 225 computer in the M.I.T. laboratory. The pupillometer permits continuous scanning and selective stimulation of the pupil for experimental and diagnostic purposes. The eyeglasses have photocells in each frame to measure the amount of light reflected from the sclera (the white of the eye) on either side of the pupil—the amount of sclera (and also of reflected light) that is "seen" by a photocell being a function of the angle of sight. With both instruments, experiments and diagnostic procedures can be directed and analyzed quickly by computer.

The machine at M.I.T. is also connected on-line to special equipment in the Neurology Laboratory of the Massachusetts General Hospital, for engineering studies of the motor co-ordination system of the hand.

A third link, to the Electrocardiology Laboratory of Massachusetts Memorial Hospital, will eventually tie in two computers—the GE machine and the IBM 7094 in the M.I.T. Computation Center—in a system for remote automatic diagnosis of the clinical electrocardiogram. This system, being developed with Dr. Gerald H. Whipple, incorporates pattern recognition techniques based on a filtering device borrowed from radar and, besides automatic diagnosis, is aimed at understanding how humans read information from EKG tracings.

Modern Languages at M.I.T.

THE DEPARTMENT of Modern Languages at M.I.T. which Professor William F. Bottiglia will head next fall is much larger and quite different from the Department that Professor William N. Locke took charge of in 1945. That fall, enrollments in it totaled only 174; they are now 1,282. The diversity and quality of its offerings have changed, too.

In elementary and intermediate classes, greater emphasis is placed now on speaking and hearing the language, and special subjects in reading French, German, and Russian have been introduced for doctoral candidates. Since 1950 undergraduates also have been given an opportunity to study linguistics, and a doctoral program in linguistics was started in 1961. In addition to hundreds of undergraduate and some special students, the Department has 25 graduate students.

An outstanding phenomenon of the last 15 years, according to Professor Locke, has been the serious and sustained interest in literature. "Our subjects are all taught in the foreign language and are on a level of sophistication which is rising year by year as more students come better prepared," he says. "We now offer at least one literature subject each semester in French, German, and Russian. A Humanities subject also has been taught in French since 1953, with such success that a second section had to be added in 1962."

Professor Bottiglia introduced a two-semester subject in Dante in 1961 which became immediately popular and has continued to attract much interest. His appointment as Head of the Department, effective next July, will enable Professor Locke to devote his full time to directing the M.I.T. Libraries.

Computer Music

ERCOLINO FERRETTI, lecturer in music at M.I.T., is using an IBM 7094 computer and electrical waveforms to produce music.

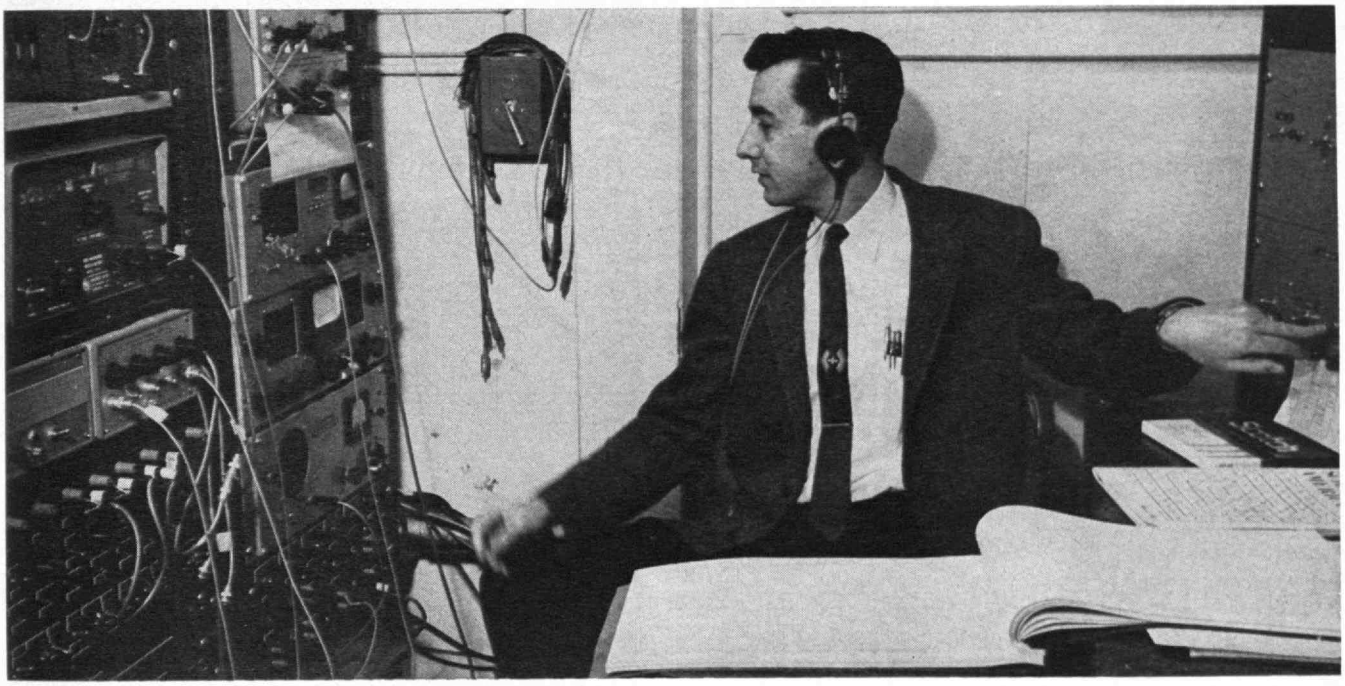
Mr. Ferretti feeds punched cards to the computer, which draws on information previously stored in its memory, and produces sounds to be recorded on tape. The tape is then played on a standard recorder. Although such electronic music is not ready for the concert hall, he looks forward to its use in conjunction with the dance and art. When computers become no more costly than pianos, he points out, an individual may have one for his personal enjoyment.

(The Trend of Affairs is continued on page 50)

Communication in a Lily Pond

The rudimentary auditory nervous system of a frog may help us understand advanced systems

BY SAMUEL JAY KEYSER



Electronic devices enable Mr. Capranica to control the croaking heard in an artificial lily pond in another room.

TO CHILDREN the chorus of grunts from a lily pond often sounds exciting, but how does it sound to the frogs? Their systems of auditory communication are primitive, yet difficult to analyze. A better understanding of such simple systems might be helpful in many scientific laboratories concerned with more advanced systems.

Hence, Robert Capranica, a doctoral candidate at M.I.T. on leave from the Bell Telephone Laboratories, has been studying what a frog hears when it listens to another frog. He has done this with the help of electronic apparatus and two colonies of frogs in the Research Laboratory of Electronics. For the frogs, he built artificial lily ponds, complete with sand, gravel, moss, and flowers, and for his experiments he placed a loudspeaker in each terrarium.

The American bullfrog, *Rana catesbeiana,* has seven easily distinguished calls. Mr. Capranica chose one of these, the mating call, and played it to his bullfrogs over a tape recorder two rooms away. He found that by appropriately cycling lighting, temperature, humidity, and feeding conditions in the ponds (to convince the frogs that it was summer-mating season instead of the dead of winter), he was able to trigger off mating-chorus responses.

What makes this particular call interesting is that it is not simply a lovelorn croaking at the moon. Naturalists have long believed that the mating call somehow enables the various species of frogs (of which there are some 2,600 throughout the world) to recognize one another. Hence the mating call is a species recognition call. It functions, in effect, to identify frogs of the same species to one another.

Mr. Capranica's objective was to find out just what it was about the mating-call sound and the frog's ear which made this identification possible. Aside from saying something about the way frogs communicate with one another, his results may hopefully provide new insight into systems of auditory communication within higher animals.

He began by tinkering with the tape recordings of the mating chorus to see what his bullfrogs would do. What they did was extremely revealing. First, he filtered the taped calls through a low- and a high-pass filter. He found that his frogs still called back to a recorded call from which all but the low-frequency energy had been filtered out. A similar test with a high-pass filter showed that his frogs also called back to a taped chorus from which all but the high-frequency energy had been removed. These results suggested that frogs were paying special attention to certain portions of

the total-frequency spectrum of the croak. In fact, they seemed to suggest that the frog's ear might well be tuned to receive sound waves of certain characteristic frequency patterns.

Operating on this assumption, Mr. Capranica conducted a second set of experiments. These corroborated his earlier experiments and defined the frequency ranges to which frogs respond more precisely. The strongest calling was evoked by energy in a low-frequency range (200 to 400 cycles), the next strongest a high range (1,000 to 1,500 cycles), and the weakest a middle range (500 to 900 cycles). These experiments suggested, furthermore, that the frog's ear is not only tuned to receive certain frequencies, but also sensitive to patterns.

Energy too largely in the middle range, Mr. Capranica found, appears to make the bullfrog suspicious of the source, and these suspicions can only be allayed by a double reassurance in the form of the simultaneous introduction of high- and low-range energy. In other words, the frog's ear is so constructed that when it hears calls which sound close but are not quite right, it requires further proof of species identity.

An interesting aspect of Capranica's conclusions, to which he was led through purely behavioral means, is that they tend to corroborate the earlier results of Moise H. Goldstein, Jr., '51, who is now at Johns Hopkins University, and Lawrence S. Frishkopf, '56, of the Bell Telephone Laboratories.

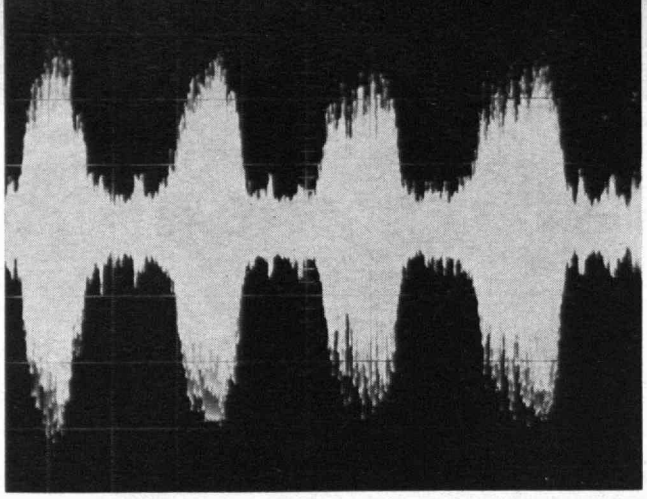
These men tapped the eighth nerve of adult bullfrogs, the nerve leading from the inner ear to the brain. They inserted a microelectrode into the nerve and measured the firing of the tapped fibers when the frog was exposed to various sorts of sound stimuli.

This technique led to their discovery of two kinds of units in the frog's eighth nerve, one which fired best to high-range frequencies, and one to low-range frequencies. Moreover, they showed that the low-range unit could be inhibited by mid-range tone bursts. Thus, through purely neurophysiological techniques, they demonstrated sensitivity of the frog's nerve fibers to both frequency ranges, and revealed the special property of the low-range unit to "hear" mid-range frequencies and to stop responding because of them.

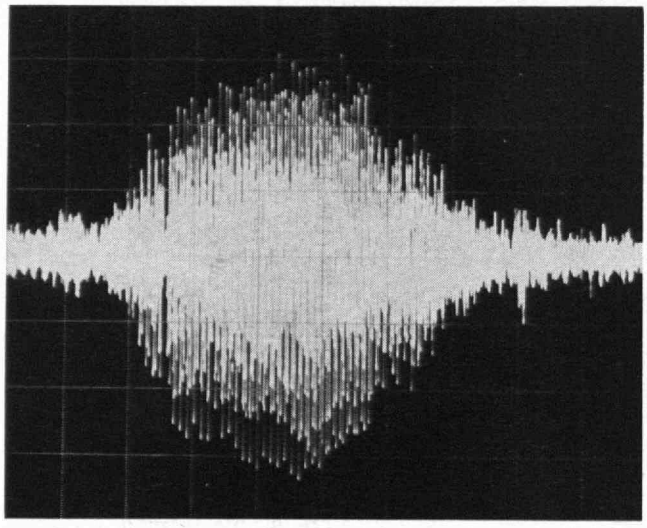
Mr. Capranica, on the other hand, showed what calling behavior the frog exhibited when exposed to the sounds which made these various units fire. In this sense, then, his work may be seen as an attempt to bridge the gap between the neurophysiological data such as that yielded by Frishkopf and Goldstein and the behavioral patterns which seem to correspond to that data.

The striking similarity between the results of the two approaches might be merely coincidental, but Mr. Capranica does not think so. Rather he feels that the similarity tends to point up an extremely fundamental principle concerning the type of creature of which the frog is an example.

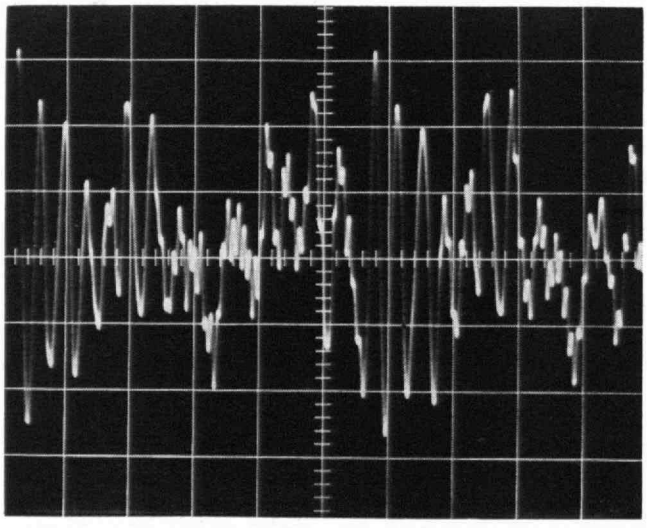
Frishkopf and Goldstein demonstrated that the fibers they were testing were "primary axons," that is, fibers located at the periphery of the frog's nervous system. The structure of these axons suggests that they analyze external sounds into three separate ranges and enable the frog to determine, on the basis of the analysis, when the source of the call is another frog and indeed a frog of their own species. And this suggests that a



Four croaks of a 5-croak mating call. Time scale: 500 msec./cm. A call may consist of two or three or up to 12 or 15 croaks. A croak may last from 0.6 to 1 second and intervals between them vary from 0.5 to 1 second.



First croak of the call at top of page. Time scale: 100 msec./cm. Note the gradual rise and fall times of the croak envelope and the spikelike structure within this croak. Its duration was about 0.7 seconds.



Expanded section of middle of same croak, showing one pulse period. Time scale: 2 msec./cm. The periodicity within it is about 94 cps. This rate can vary from frog to frog and from about 80 to 120 cps.

fundamental principle on which the frog is constructed gives it the ability to perform rather sophisticated analyses of external stimuli at the periphery of the nervous system, in this case at the ear.

It is the result of these analyses, performed at the periphery, which are then transmitted to the frog's brain, and it is presumably the nature of the transmitted analysis which determines what the frog will do. Thus a sound wave analyzed by the frog's ear as a midrange signal may well be transmitted to the brain as an instruction for the frog to keep silent, while a sound wave analyzed by the frog's ear as a high- and a low-range signal may well be transmitted to the frog's brain as an instruction to commence croaking because another bullfrog is nearby.

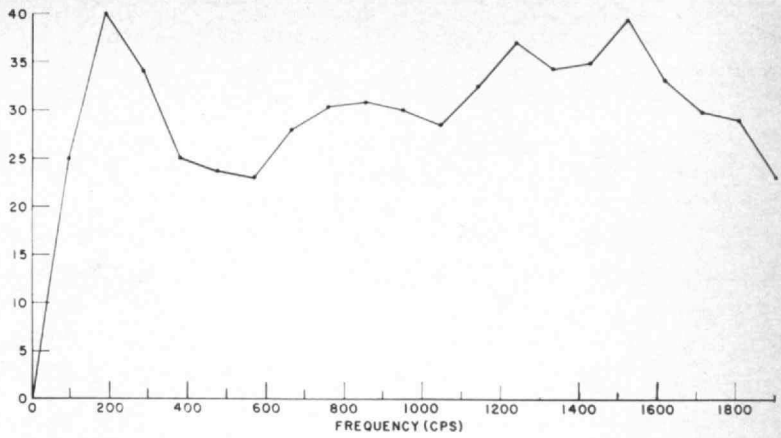
Independent evidence to support Capranica's view of the role of the ear in *Rana catesbeiana's* nervous system has been provided by Drs. Jerome Lettvin, '47, and Umberto Maturana (see Technology Review, April, 1963) who have demonstrated that the frog is a creature capable of performing a high degree of abstraction at the periphery of the nervous system where the external stimuli are wavelengths of a very high frequency, namely light, and where the peripheral organ which performs a complicated analysis upon that light is the eye.

This spring Capranica began a set of experiments in which he is attempting to fool the frog. Whereas he previously used real frog choruses which he had tinkered with, he now is fabricating a frog's croak artificially. By means of electronic apparatus capable of producing sounds with energy in predetermined frequencies, he has succeeded in manufacturing some bogus calls that have sounded enough like a bullfrog to fool his own bullfrogs, who have called back to the artificial croaks. Through the refinement of experiments such as these, Mr. Capranica hopes to demonstrate with even greater specificity the exact nature of the sounds a bullfrog hears when he listens.

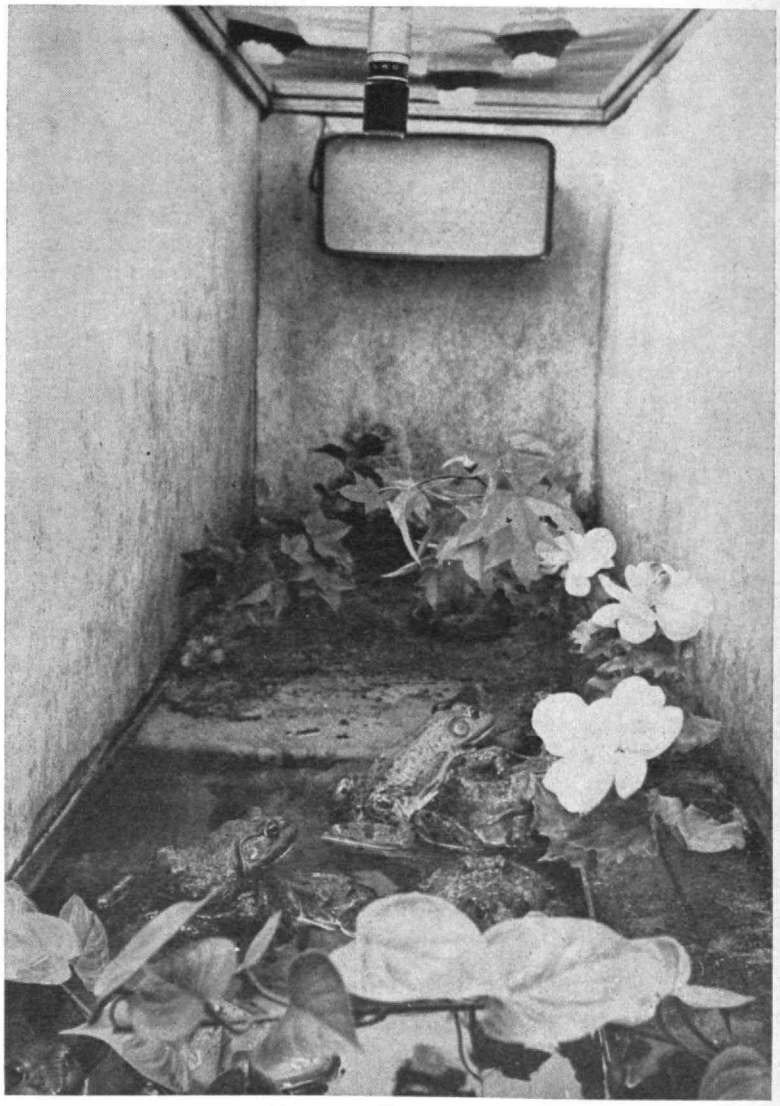
When studies such as these are expanded to other species of frogs, it may well turn out that each species is born with a hearing apparatus rigidly tuned to its own characteristic frequency combination, one which only the croak from another frog of the same species can unlock. If this is true, then a great deal will have been learned about the way frogs communicate.

There is, however, another reason for undertaking a study of this sort. It has often been noted that the frog, an amphibian, is the first animal to successfully bridge the gap between life in the sea and life on land. But what has been less often noted is that the auditory nervous system of the frog may be a rudimentary analog of the hearing system of much higher animals, including man.

To study what calls a frog is capable of making and what parts of these calls he is capable of hearing, then, may not only tell us something about the way life was able to move from the sea to the land, but it may also provide important clues to the intermediary steps in the development of those mechanisms sensitive to airborne sound in higher land animals. An accumulation of studies such as these might one day enable us to understand how the highest refinement of sound and its reception, namely human language, was achieved by Nature, but this, at present, is still only a fond hope.



Average spectral amplitudes of the harmonic components for the croak shown expanded on the opposite page. Harmonics occur every 94 cycles. Note the relative peaks at 200 cps and 1200-1500 cps. A relative dip in energy occurs from 400 to 600 cps. These three ranges appear to play a decisive role in the ability of the bullfrog to recognize the mating calls of its own species.



This is the pond, and these are some of the frogs, used to analyze croaks. The mating call by which they are believed to identify their species has been evoked with a loudspeaker fed by a tape recorder in another office.

Institute Yesteryears

As recalled by the late H. E. Lobdell, '17

25 Years Ago

THE REVIEW reported that: "Weather conditions high over the North Atlantic from the Gulf of Mexico to the Grand Bank are being studied in an experimental international research program organized under the direction of C.-G. A. Rossby, Head of the Institute's meteorological laboratory. This program has special significance, meteorological authorities revealed, because of plans for inauguration this summer of regular transatlantic air service between North America and England.

"The study is a co-operative project in which the United States Weather Bureau, United States Coast Guard vessels, the meteorological staff of M.I.T., and that of the Blue Hill Observatory are participating. In addition, the Friez Instrument Company of Baltimore has donated 95 instruments to M.I.T. for studying conditions at Bermuda. Professor Rossby said that the American phase of the project grew out of a suggestion of Commander *Edward H. Smith, '13* . . . of the United States Coast Guard . . ."

► Faculty promotions included:

To Professor: *Victor O. Homerberg, '21,* in the Department of Metallurgy; *Joseph H. Keenan, '22,* Mechanical Engineering; *Otto C. Koppen, '24,* and *Joseph S. Newell, '19,* Aeronautical Engineering; *Philip M. Morse, Manuel S. Vallarta, '21,* and *Bertram E. Warren, '24,* Physics.

To Associate Professor: *Lawrence B. Anderson, '30, Herbert L. Beckwith, '26,* and *John L. Reid, '31,* Architecture; *Francis W. Sears, '20,* Physics.

To Assistant Professor: *Gordon S. Brown, '31,* Electrical Engineering; *Carl F. Floe, '35,* Metallurgy; *Harold A. Freeman, '31,* Economics and Social Science; *Henry G. Houghton, Jr., '27,* Aeronautical Engineering; *Norman Levinson, '33,* Mathematics; *Carl M. F. Peterson, '29,* Mechanical Engineering; *Irwin W. Sizer,* Biology and Public Health.

50 Years Ago

A NEW COURSE entitled "Engineering Administration" and bearing the number "XV" was offered, and President Richard C. Maclaurin observed that:

"There are two usual routes open to the man who wishes to reach the head of a great industrial corporation: one is, as the shop phrase expresses it, 'through the boiler room,' and the other through the office. The one who begins at the bottom of the mechanical plant gets, of necessity, a thorough knowledge of the technical end of the work. He must acquire what is nearly as essential to him, the business knowledge, as best he can and usually in irregular fashion and from persons not expert in teaching. The man who enters the office must, to an extent, work down and will be obliged to learn as best he can something of engineering.

"It is the purpose of the new Course to take the middle way and afford to the students practical proportions both of engineering and administration. The man who is graduated from Technology after following this new Course will set out into practical life equipped with the essential things in the training of an engineer and a man of business. His later success will depend, as in all other cases, on his innate capacity and his power of profiting from the experience of life."

75 Years Ago

THE 75 degree recipients of the Institute's 22d class were divided as follows: mechanical engineering, 24; electrical engineering, 17; civil engineering, 14; chemistry, 8; mining engineering, 5; architecture, 3; general science, 2; biology, 1; and physics, 1.

With the addition of the Class of 1889, the Institute had 659 graduates, all but 32 of whom were living.

96 Years Ago

IN MAY, 1868, 13 members of the Institute's first class were graduated.

100 Years Ago

THE 23d MEETING of the "Government" held May 9, 1864, was called at the request of the Building Committee and M. Denman Ross "of said Committee observed that the object was to ascertain the views of the Government in reference to a formal laying of the corner stone of the Institute's Building.

"From the wishes he had heard expressed, and from his own inclination in the matter, believing that such a course would be advantageous in directing attention, and informing the community relative to the objects and great utility of the Institute, thereby facilitating the operations of the Finance Committee in soliciting contributions, he would move that there be a formal laying of the corner stone of the Institute's Building, and that there be a Public Celebration on the occasion.

"E. B. Bigelow, Esq., remarked that the project did not strike him favorably, and he doubted the expediency of adopting such a course. He deemed it far more important in the way of promoting the true interests of the Institute, and of securing the necessary public patronage at this time to devote our best efforts to developing the working energies of the Institute, than to occupy ourselves in making a display about the Building; the latter being of minor importance to the former."

Several other members having spoken against the idea of a public celebration it was voted to refer the matter for decision to the Institute's Annual Meeting; but almost immediately that vote was reconsidered, "whereupon the whole subject was again opened.

"Mr. Ross expressed himself still in favor of a celebration. He did not however desire any action out of deference to his private wishes . . . Mr. Bigelow observed that his views adverse to the proposed celebration remained unchanged and upon further reflection were rather confirmed. . . ."

On motion of General Edmands it was then: "Voted, that the Secretary call a Meeting of the Government on Saturday next at four o'clock P.M. to consider the propriety and expediency of a formal public laying of the Corner Stone."

At this meeting, there was further debate and it was: "Voted, that the subject be indefinitely postponed."

Cleveland conferees (from left): William C. Sessions, '26, James R. Killian, Jr., '26, Stanley M. Proctor, '43, and George R. Harrison.

Alumni Examine Tomorrow's Edge

Cleveland club presents a program for guidance counselors and ponders advances in education, biology, and engineering

MORE than 200 Alumni, wives, guests, and invited high school guidance counselors gathered at the Mid-Day Club in Cleveland, March 7, for a special two-part M.I.T. symposium, "The Edge of Tomorrow."

At the morning session, 70 high school guidance counselors from northern Ohio and western Pennsylvania heard talks by Robert Holden, Associate Dean of Student Affairs; Roland Greeley, Director of Admissions; and Jack Frailey, '44, Director of Student Aid. Their topics were the Institute environment (to give the counselors an impression of what entering students encounter); how selection for admission is made; and the need for and amount of student aid available. The purpose of the session was to give a brief but realistic picture of the Institute to an important group of people—the counselors who recommend to students the best colleges for them to attend. A few of the points made were:

► The academic evaluation of students by means of the College Entrance Boards is highly objective, seeking to answer the question: What is the percentage chance of a given student to do C work or better his first year? Carefully designed to balance against this is a highly subjective evaluation of the student's personal qualities and sense of commitment made on the basis of letters of recommendation and interviews at M.I.T., or with one of the Institute's 800 Educational counselors. It is likely that increasing emphasis will be placed on this subjective evaluation.

► A rough estimate of the cost of a student's education can be made by dividing the academic budget by the number of students, giving (for 1963) a figure of $3900. This means that currently each student receives a "hidden scholarship" of approximately $2200, the difference between his tuition and actual cost.

► Although the cost of education has been steadily increasing, so also has the graduating student's earning power. This increase in earning power puts the increase in tuition into a better perspective. The tuition 15 years ago was $700; now it is $1700. However, while it took the average student 11.5 months to earn what he had spent on tuition 15 years ago, it now takes him only 9.9 months.

The three principal morning speakers were joined by Richard W. Day, Headmaster of Hawken School, and by Albert T. Senft, assistant principal of Shaker Heights High School, in a panel discussion.

The luncheon speaker was Robert Winters, '33, President of the Alumni Association, and chief executive of BRINCO, a $1 billion hydroelectric development in Newfoundland. Mr. Winters made some informal remarks, and introduced the afternoon speakers.

In "The Scientific Origins of Modern Engineering," Dean Emeritus George R. Harrison of the School of Science discussed the long-standing controversy over the amount of science behind engineering fields as they developed, and of the debt of both to technology. *(See page 15).*

Professor Irwin Sizer, Head of the Department of Biology, devoted most of his talk, "Science Today and Its Impact Tomorrow," to a review of current problems in biology. In a description of molecular biology, he moved from what is known about the living cell to current knowledge of the protein structure of the giant molecules within the cell, and finally to the arrangements of amino acids within the proteins. He identified some molecular "hot spots" which are crucial areas for an understanding of the molecular basis of life. He then reviewed some recent work in transplants, such as the successful preparation of cow arteries for acceptance by man to replace damaged or diseased human arteries. As another very active area of research, he mentioned the efforts to localize functions in the human

brain, by geographically identifying such things as memory.

Looking ahead, Professor Sizer made two comments on "tomorrow." First, he said that the synthesis of a living cell, probably within the next very few decades, will have enormous philosophical implications for man's ideas about the nature of life. Second, he said that automation, at the same time that it brings unemployment, is also bringing more leisure time. If we can learn to use this leisure properly, he said, we can imagine a great flowering of civilization.

Professor Holt Ashley of the Department of Aeronautics and Astronautics talked about "Engineering, Science, and Education for Tomorrow." He gave a progress report on the work of a faculty committee which is currently studying the present undergraduate program and the future curricular needs of M.I.T. He reported that the committee members had come to a number of general conclusions: (1) entering students have much greater ability and intellectual maturity than even five years ago; (2) most entering students are much better prepared, bringing understanding instead of just knowledge (and this situation is improving rapidly); (3) present student life is too fragmented; (4) it must be recognized that a student can no longer be taught, in four or five or seven years, all there is to know about physics or chemistry, let alone an engineering subject—he must be given an understanding to carry on a process of self-education effectively and indefinitely; (5) students should be taught to understand a few things thoroughly; (6) more educational flexibility and freedom is needed. Specific recommendations based on these general conclusions are now being discussed and debated by the Faculty.

A Spreading Interest

In an after-dinner address, Chairman James R. Killian, Jr., '26, of the M.I.T. Corporation, discussed some current innovations in teaching. He listed several new circumstances that are encouraging innovation and renewal in education: 47 million students, 1.7 million teachers—and a need for at least 200,000 new teachers each year just to stay where we are. He cited the accelerated growth of knowledge (and the inevitable problems of obsolescence it causes); a renewed interest on the part of advanced scholars in the elementary aspects of their subjects; many recent advances in the psychology of learning; and the present inadequate amount of R&D (the government allots to curriculum development only $25 million a year) in education which, he said, is a $30 billion industry.

He reviewed the work of the Physical Science Study Committee, now being used by 160,000 high school students (between 35 and 40 per cent of the nation's total). He called the textbook *Physics* one of the most important books published in the last decade because of the new standard it has set for textbooks in many fields. He also mentioned some of the more than 20 other projects in curriculum reform and design now being carried out by Educational Services Incorporated, formed in 1958 as a nonprofit corporation to carry on the PSSC. These new projects include work in elementary science, secondary school social studies and mathematics, college-level subjects, and several projects in Africa and Asia.

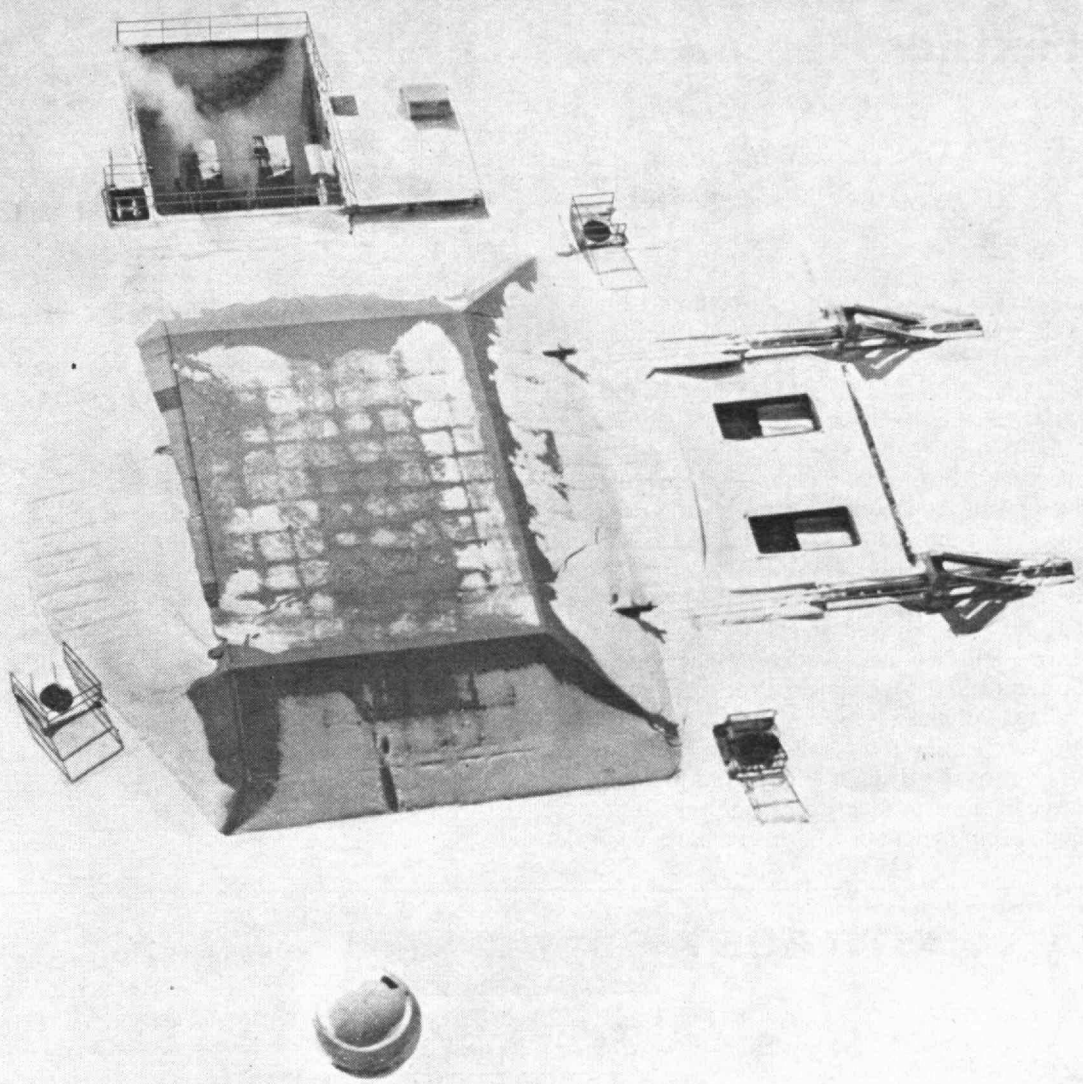
The most encouraging aspect of the impressive movement toward better pre-college education, Dr. Killian said, is the spreading interest in teaching—teaching at *all* levels—among leading university research scholars and scientists who are working closely with teachers in the lower schools. This, he said, is bringing to the whole education process the qualities of relevance, up-to-dateness and integrity which it so urgently needs.

Donald D. Scarff, '41, general manager of General Electric Company's Lamp Division at Nela Park, was general chairman of the conference and was ably assisted by Stanley M. Proctor, '43, President of Cleveland's M.I.T. Club and President of Stanley M. Proctor Company, and by Robert J. Fay, '42, Executive Vice-president of the Cleveland club and senior partner of Fay and Fay, patent attorneys.

—NELSON LEES, '53.

Donald D. Scarff, '41, general chairman of the conference.

Henri P. Junod, '21, and Mr. Sessions with two of the speakers, Dean Emeritus Harrison and Alumni Association President Robert H. Winters, '33.



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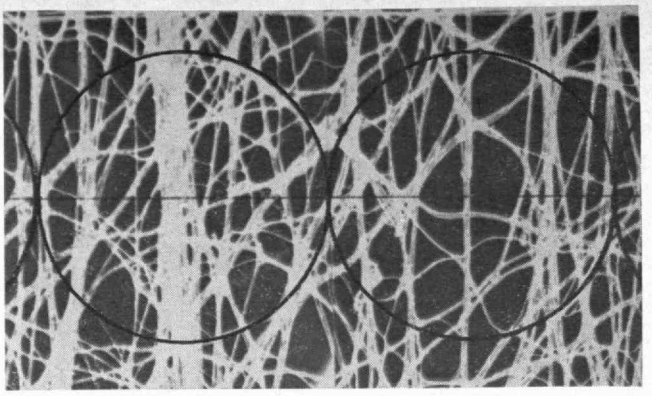
Structural Mechanics Of Textiles

New engineering ideas will be presented in summer programs



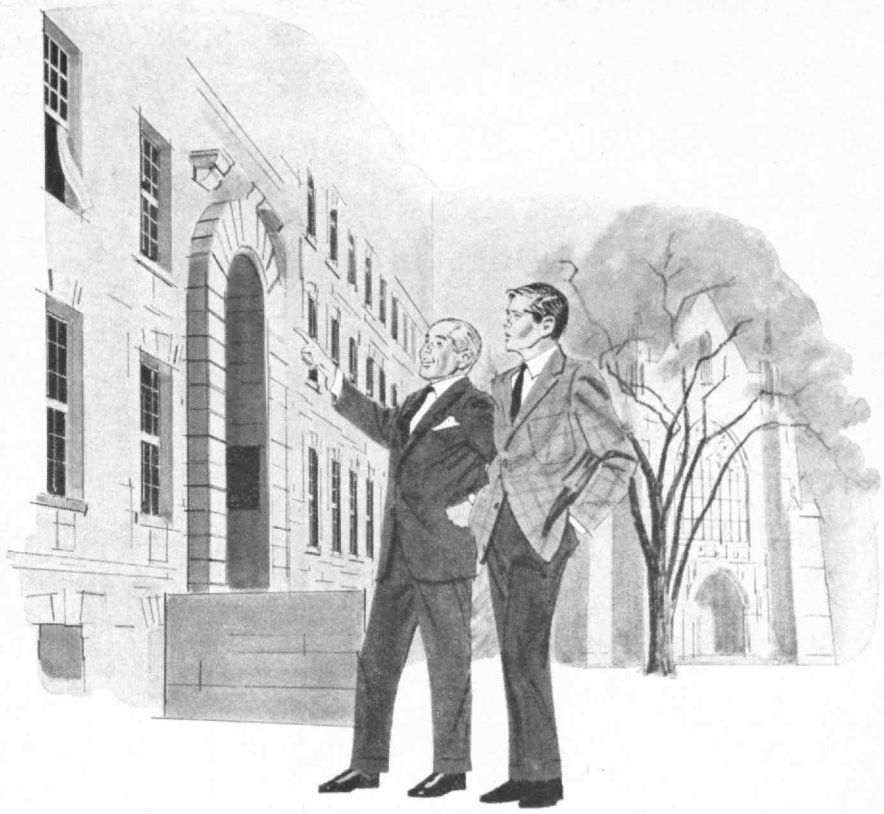
A photomicrograph of a non-woven fabric with unit cell markings used in its mechanical analysis at the Institute.

FOR the second of three summer programs being offered this year by the Textile Division of the Mechanical Engineering Department, Professors Stanley Backer, '41, and John Hearle have chosen the title "Structural Mechanics of Textiles." This is perhaps the first time that this particular phrase has been used; and its use reflects a growing confidence in the application of the principles of engineering science to the design of textile fabrics. The preceding week's course deals with similar problems nearer the molecular level; but, since quantitative and analytic work in this field has not yet advanced so far, this course, which is directed by Professors Hearle and Rodney Andrews, has the longer title of "Structure and Mechanical Properties of Fibres and Crystalline Polymers."

Traditionally, textile fabrics have been created by the art and craft of the textile designer and the millman. The situation in fiber production is not very different: the mechanical characteristics of fibers have been determined by the skills of the farmer and breeder, or the chemist and chemical engineer. But now a change is coming, similar to the change which has come in the methods of designing buildings as a result of the development of structural engineering.

There is one important difference: The structural engineer can plan exactly where his components should be placed. This is not usually true in textiles. The internal structure of a fiber depends on how the molecules pack together during crystallization—and this can only be indirectly influenced by control of temperature, stretch, chemical environment, and so on. In the same way the arrangement of fibers in a yarn and, to a lesser extent,

(Concluded on page 40)



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Structural Mechanics of Textiles

(Concluded from page 38)

of the yarns in a fabric is governed not by deliberate design decisions, but indirectly in the operations of textile processes. Fibers are not placed individually; their final position depends on the way they react to forces applied to the mass of fibers which is moving through textile machinery (and here one finds the connection with the third of the summer programs, led by Professors Backer and Aidan McNamara on "The Dynamics of Textile Processes").

One of the first attempts at an analysis of the mechanics of a textile structure is contained in a paper on the strength of twisted yarns published by Charles Gégauff in 1907. A great name in the field was that of F. T. Peirce who worked in the 1920's, '30's, and '40's, and another important contributor was Professor E. R. Schwarz, '21, who led the Textile Division at M.I.T. from 1930 to 1961. More recently, there have been significant contributions by a group at Fabric Research Laboratories (many of whom were graduated from M. I. T.), by Stanley Backer, by John Hearle (at the University of Manchester, currently a visiting professor at M.I.T.) and by L. R. G. Treloar.

Two major themes run through this academic work: one is the formulation and analysis of idealized models of textile structures, and the other is the study of textile materials to discover their real structure and where their actual properties deviate from theoretical predictions. All this gives useful background knowledge to the practicing textile technologist. But, more important, attempts are now being made to design and predict the properties of novel assemblies of fibers as a guide to practical developments.

Three things have given a particular urgency to the situation. The first is the introduction of many new fibers. The range of possibilities is now enormous, and beyond the reach of evaluation by a pure process of trial and error. Furthermore the fiber producers need guidance regarding what new fibers to aim at producing. The second is the introduction of new types of fabric—a whole variety of non-woven fabrics which are easier to produce and offer new opportunities to the textile industry. The third is the introduction of new processing methods (e. g., new methods of spinning) which may result in new structures and different properties.

In the fiber and polymer industries, too, there is an increasing realization that physical fine structure is as important as chemical constitution in determining properties and usefulness. Rayon is a good example: The new, successful high modulus fiber differs from the older forms only in the way in which the molecules are packed together. Consequently there is a great interest in polymer crystallization in all its aspects, and in the theoretical analysis of properties in terms of what can be found out about structure. It is interesting that there are many similarities between the supramolecular structure of fibers and polymers and the larger scale structure of textile materials. There are useful analogies between the mechanics of a cotton fiber and the mechanics of a twisted yarn; and a non-woven fabric is not very different from a much enlarged model of a polymer film.

The three summer programs at M.I.T. will be directed at those who wish to apply these new ideas to the creation of fibers, polymer systems, and textile materials.

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New Books

(Concluded from page 26)

AMOS FORTUNE'S CHOICE, by F. Alexander Magoun, '18 *(Bond Wheelwright, $5).*

Reviewed by John J. Rowlands
Director, Emeritus, of the M.I.T. News Service

AMOS FORTUNE'S CHOICE by F. Alexander Magoun, '18, is more than an interesting account of the life of a young slave in New England. As background for the bitter controversy over race prejudice and integration it is a significant document for appraising the present status of the Negro in the United States. It is a Negro Book Club Selection.

The lonely and unhappy life of Amos Fortune reveals the beginnings of a peculiarly vicious type of prejudice against the colored man, the practice of savage cruelties and the growth of insidious standards of justice that exist in some parts of the country to this day.

The book takes its title from the problem that faced Amos from the beginning. He had to choose between bitter hatred for the white man or forgiveness for his plight, emotions that in a more subtle form still influence solution of the problem of human rights.

Professor Magoun's story of a colored man who triumphed over the bitterness of inhuman treatment is written with sensitive understanding of the limits of human endurance. Copious footnotes indicate how thorough was his research and the evaluation of the material. He reminds New Englanders what many may have forgotten or never knew: that Boston was one of the great ports of entry in the slave trade and that on wharves that still exist colored men were sold on the auction block to work at the level of animals in the cities and farms of the North.

The slave boy had his share of hatred and cruelty, and when a comparatively considerate owner sent him to school he was stoned by his white companions.

Yet Amos lived to buy his freedom and to pay for the freedom of the woman he married. She lived only a few months, and Amos married again, but a second time he had to buy his wife's freedom before he could marry her.

Amos won the grudging respect of his white neighbors when, after establishing a small tannery, he died in a home of his own in New Hampshire. What few rights he was granted he paid for.

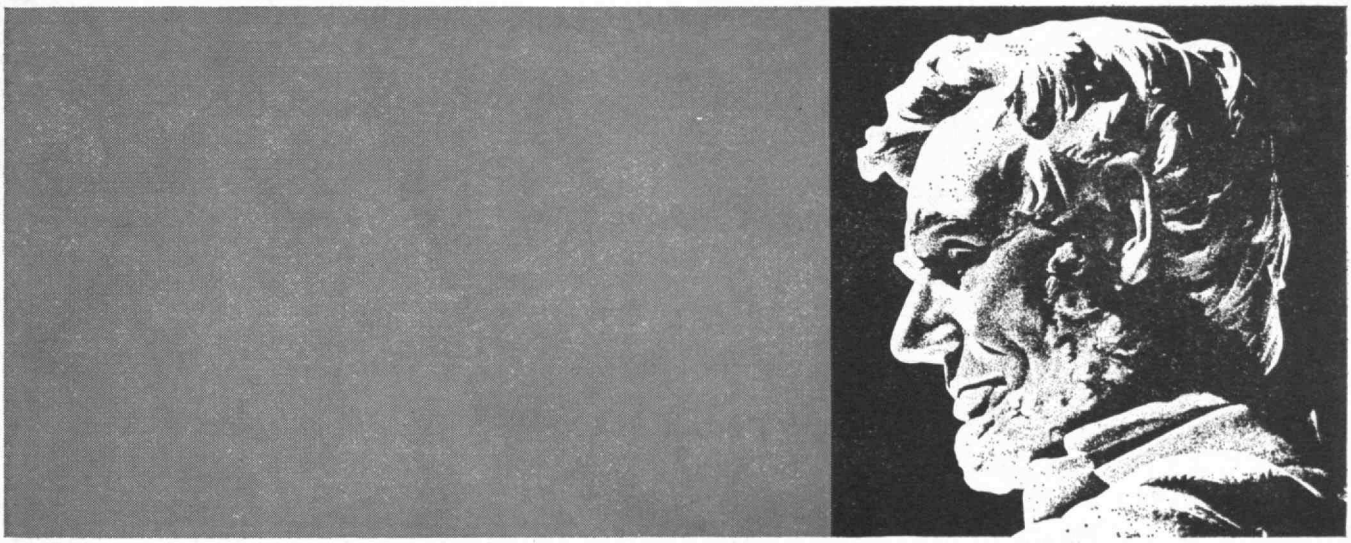
Have You Seen These?

OTHER recent books likely to be of especial interest to many M.I.T. Alumni have included:

Education, Manpower and Economic Growth: Strategies of Human Resource Development, by Professor Charles A. Myers of M.I.T. and Professor Frederick H. Harbison of Princeton (McGraw-Hill Book Company, Inc., $7.50).

Elementary Particles, by Professor David H. Frisch, '47, and Alan M. Thorndike, published for the Commission of College Physics (Van Nostrand Momentum paperback, $1.75).

Science and IDA



Washington is the decision-making center of the free world. In that center, IDA functions as a scientific adviser to the Department of Defense. Our working environment is the gray area of those major national problems where too little is known and too much is at risk to hazard an intuitive decision. IDA provides responsible DOD decision-makers with the scientific/technical input required to eliminate or lessen the areas of uncertainty.

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Students, Materials, and Science

(Concluded from page 25)

I, as you know perfectly well, have got two hats; I've got my hat which I wear as a professor of physics, and I've got a loyalty to the Department of Physics; and I have, of course, my loyalty to the center, and frankly I don't find them conflicting.

Q. *Will the center emphasize research entirely?*

A. Well, no! I personally regard as a very important part of teaching at the Institute the training of graduate students, and the center, or the laboratory rather, will be a place where graduate students will get very good basic training, I hope. From that point of view, I think it will play an important part in the teaching . . . this is where I believe a place like the interdisciplinary laboratory differs from a setup like Lincoln Laboratory. A laboratory like Lincoln Laboratory has research as its primary objective, and research directed toward a very specific purpose—the defense of the nation. On the other hand, the interdisciplinary laboratory has the dual function of research in materials science which ultimately will have impact on things like defense and—this is very, *very* important—the training of generation after generation of graduate students. From that point of view, the laboratory is an important teaching center. There will be a certain amount of undergraduate instruction done in the laboratory as well, but this, to begin with anyway, will be small; it will be mainly graduate instruction.

Q. *A number of scientists are coming to the United States from Britain . . .*

A. A lot of people have asked me my views on the flow of British scientists to the U.S.A., and I think there is a very simple answer to this at the moment—that Britain does not, or shall I say the government in Britain, is not prepared at this moment in time, to spend enough money on scientific research fully to employ and exploit the scientific potential. So, many scientists find that they do not have adequate research facilities to do the jobs they feel they want to do. They find they can get these in the U.S.A., that they are welcome in the U.S.A., and so they are attracted.

There's been a great deal of talk of pay, and certainly scientists are better paid in the U.S.A. than they are in England, though the difference is not that much. It's considerable for the younger man—a man who has just got a Ph.D. and takes a job in the U.S.A. is better off financially than in England, particularly in academic work. The more junior grades in British universities are rather poorly paid. When it comes to the more senior grades, including professors, the difference isn't so much as to make this a deciding factor. But I just don't believe that pay is the factor that makes senior scientists leave England and come to the U.S.A. It is research facilities and opportunity—opportunity to break out into fields that they can't get into in England simply because the money isn't there to do it. Scientific research costs money. Some people have their needs supplied; some don't, so they go. It's just as simple as that.

Q. *Do you still follow closely research in Great Britain?*

A. As a Fellow of the Royal Society I get consulted still about quite a lot of problems. At the moment one of the interesting problems is whether or not Britain should invest in a National Magnet Laboratory—not exactly the same as the National Magnet Laboratory here, but an institute of some kind set aside for very high-field research. . . .

I personally feel that scientific research in Britain has certainly been going through a low, if you like, but I don't believe it will stay down. I believe it will come up.

Q. *What direction would this likely take?*

A. That's very difficult to predict. You never really know where science is going to break out, and the way it will come about. What I feel is that one or two new fields of activity will break open. Well, there are some now that one could almost point to: the study of very large molecules, for example, I think is one of the outstanding contributions of British science, the study of the protein molecules and the synthesis and understanding of the basic structure of these biological molecules. People realize that this is so important that it's just got to be supported, and money will be found, I think, to support it. This is going to take courage and investment. One thing that maybe I ought to comment on that I've seen since I've been over in the States here is the generous support of scientific research by industry. I don't believe that British industry has really played its part to anything like the same extent in supporting scientific research.

This man's career in Seattle began 2,052 miles away

New England Life agent Arlen Prentice (University of Washington '59) discusses a key-man insurance program with Larry Mounger (University of Washington '59), secretary and legal counsel of Pacific Trail Sportswear Corporation.

It started in Chicago. After college and the service, Arlen Prentice took a position there as a salaried officer of a national fraternity. It was interesting work, but for Arlen something was lacking: challenge . . . long-range potential.

Then a prominent fraternity brother had a talk with him about plans for the future. This man was a New England Life general agent. He pointed out the opportunities with this company and convinced Arlen that life insurance could give him the kind of career he was after.

Arlen liked what he heard. But there was one drawback. Much as he felt that here was the man who could guide him to his full potential in this business, he had always hoped to settle in the Seattle area. Although he regretted losing Arlen, our Chicago general agent quickly assured him that he could also get what he wanted in our Seattle agency. He then wrote his counterpart in Seattle, strongly recommending Arlen. "Our loss is your gain," he said.

For Arlen this is already working out very well. He's found he can provide a service to businessmen that is welcomed. And he's getting direct results in earnings. As Arlen puts it: "Even as a new man in the business, I didn't have to limit myself to any particular 'class' of prospect. New England Life has prepared me for going after big accounts as well as modest ones."

Our general agencies throughout the country provide support and direction to help men with aptitude for our business realize their full potential. If a career like Arlen Prentice's interests you at all, there's an easy first step to take. Send for our free Personality-Aptitude Analyzer. It's a simple exercise you can take on your own in about ten minutes. Then return it to us and we'll mail you the results. (This is a bona fide analysis and many men find they cannot qualify.) It could be well worth ten minutes of your time.

Write to New England Life, Dept. AL, 501 Boylston Street, Boston, Mass. 02117.

NEW ENGLAND LIFE

NEW ENGLAND MUTUAL LIFE INSURANCE COMPANY: ALL FORMS OF INDIVIDUAL AND GROUP LIFE INSURANCE, ANNUITIES AND PENSIONS, GROUP HEALTH COVERAGES.

Individuals Noteworthy

(Continued from page 8)

New Posts

NAMED in the news of promotions, elections, and appointments recently were:

Abbott L. Johnson, '22, as Chairman of the Board, Warner Machine Products, Inc. . . . *George P. Edmonds, '26,* and *J. Sellers Bancroft, '27,* respectively, as Chairman of the Board and Member of Executive and Trust Committees; and as Senior Vice-president, Wilmington (Del.) Trust Company;

Thomas E. Garrard, '28, as President, McAlester Fuel Company . . . *Robert N. Eck, '34,* as Manager, Power Distribution and Control Engineering, Cutler-Hammer . . . *Arthur R. Anderson, '35,* and *Paul F. Rice, '47,* respectively, as Vice-president and as a Director, American Concrete Institute;

Herbert K. Weiss, '37, and *Kelsey Walker, Jr., '52,* respectively, as Group Director of Plans Development and Analysis, System Planning Division, and as Senior Staff Engineer, Manned Systems Division—Aerospace Corporation . . . *Frank E. Plumley, '40,* as Manager, Central Purchasing, West Virginia Pulp and Paper Company;

David Christison, '42, as Manager, Employee Relations, Socony Mobil Oil Company, Inc. . . . *Robert W. Seavey, '42,* as Manager of Engineering, Cryonetics Corporation. . . *Arthur L. Bryant, '44,* as Director, Supporting Services, Arthur D. Little, Inc.;

Edmond J. Tyberghein, '44, as Head, Transmission Components and Common Systems Quality Department, Bell Telephone Laboratories . . . *Thomas F. Malone, '46,* as Vice-president, Research Department, The Travelers Insurance Companies . . . *Walter E. Moore, Jr, '48,* as Manager, Truck and Mileage Tire Engineering, The Firestone Tire & Rubber Company;

W. H. Thorbecke, '48, as General Manager, International Operations, Chemical Coatings Division, Mobil Chemical Company . . . *William M. Wells, Jr., '48,* as a Member, Materials Advisory Board, National Academy of Sciences—National Research Council . . . *Robert L. Hamman, '49,* as Professor and Chairman of Business Administra-

tion Division, Pennsylvania Military College;

Standish C. Hartman, Jr., '53, as Assistant Professor of Biological Chemistry, Faculty of Medicine, Harvard University . . . *George L. Spoll, '54,* as President, The Home Builders Association of Hartford County (Conn.) . . . *George B. Raymond, '55,* as Vice-president, Raymond Engineering Laboratory, Inc. . . . *Robert G. Fulks, '58,* as a Member, Curriculum Advisory Committee, Franklin Institute of Boston.

Honors to Alumni

RECIPIENTS of recent awards and similar distinctions have included:

Edward Hurst, '13, a Citation for "Service Extraordinary to Industry Through Improved Abrasives" by The Carborundum Company . . . *J. Warren Horton, '14,* the 1963 Pioneers of Underwater Acoustics Medal by the Acoustical Society of America . . . *Raymond C. Reese, '20,* the Henry L. Kennedy Award by the American Concrete Institute;

Glenn Stanton, '21, the Commendation Certificate for Outstanding Public Service by the Oregon Building Congress . . . *Captain John S. DeWitt, '51, Lieutenant Colonel Richard V. Walker, '54, Captains Frank J. Bielsik, '58,* and *William J. Delaney, '59,* Commendation Medals by the U. S. Air Force;

Lawrence P. Kaufman, '55, the Rossiter W. Raymond Award by the American Institute of Mining, Metallurgical, and Petroleum Engineers . . . *Harry B. Lee, Jr., '57,* the Browder J. Thompson Award by the Institute of Electrical and Electronics Engineers . . . *T. Don Shreffler, '57,* the Outstanding Ohio Young Engineer Award by the Ohio Society of Professional Engineers, and the Distinguished Service Award by the Toledo Junior Chamber of Commerce.

Today's Einsteins

THE SEVEN SUCCESSORS to Einstein named by The New York *Herald Tribune's* science editor in a Sunday feature February 23 included *Richard P. Feynman, '39,* and *Murray Gell-Mann, '51,* both of whom are now professors at the California Institute of Technology.

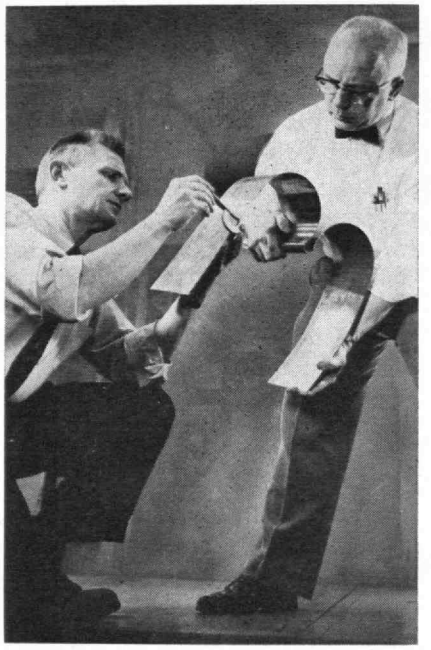
(*Concluded on page 48*)

Individuals Noteworthy

(Concluded from page 47)

In Metal Rolling

FUNDAMENTAL studies of the effects of cyclic plastic strain on metal by Louis F. Coffin, Jr., '49, of General Electric, have resulted in a new method of metal rolling that the U.S. Steel Corporation will develop further. In the new process, the



Louis F. Coffin, Jr., '49 (at left).

metal is squeezed, bent, and pulled simultaneously. This is expected to make the use of lighter, less expensive mills possible, and larger reductions in thickness on each pass through the rolls.

Conference Planners

TO ASSIST Chairman Samuel A. Groves, '34, in planning the Fifth Alumni Officers' Conference at M.I.T. next September 11 and 12, a committee has been formed consisting of D. Hugh Darden, William S. Edgerly, '49, Douglas F. G. Haven, '52, Frederick G. Lehmann, '51, Francis M. Mead, '29, and George J. Schwartz, '42.

Dance Instruction

GUS SOLOMONS, JR., '61, returned to M.I.T. in February to conduct a special series of 12 classes in the fencing room of the Du Pont Athletic Center for students interested in modern dance and stage movement. As an undergraduate, Mr. Solomons choreographed and starred in four Tech Shows and played leading roles in several Dramashop productions.

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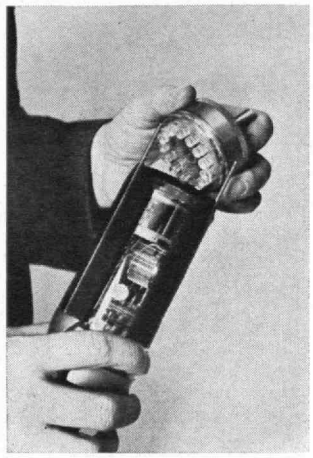
Trend of Affairs

(Continued from page 30)

Payload to Mars

A "MULTIVATOR," to analyze Martian dust for signs of life, was described this winter in *Stanford Today* by Elliott Levinthal, '43, who is directing work on it in an instrumentation laboratory of the genetics department in the Stanford School of Medicine with NASA support.

"The instrument we are designing for the earliest missions must collect and analyze a few grams of Martian soil or dust for signs of microbial life, the specific identifying properties of which are, of course, presently unknown," he wrote. "The results of the analysis must be in such a form that they can be radioed, with very little power, 50 million miles back to Earth. The instrument must be small, weighing but a few pounds, yet be rugged enough to withstand the impact of landing through a thin atmosphere, in high-velocity winds, on an unknown surface. It must withstand sterilization—preferably by heating to 135 degrees Centigrade for 24 hours—and function reliably after lying dormant for six months of space flight. And we must keep in mind constantly that the constraints of the first mission to Mars are not yet known. Our designs must be readily adaptable to changes of many kinds before the payload is finally planned."



Elliott Levinthal, '43, and the heart of the "multivator."

The goal of the Multivator's developers, not yet attained, is to be able to measure incidences as low as 100 to 1,000 bacteria in samples of one to 10 milligrams of Martian soil. One of the assays being considered for the first mission would be for phosphatase, an enzyme widespread among terrestrial organisms. The products of a biochemical reaction by which it might be discovered are fluorescent, and the light from them might be detected by a photo-multiplier. But diversification is important, Dr. Levinthal writes, because "there can never be a single, definitive detection experiment which will cover all possible manifestations of life."

Instrumentation Laboratory Honored

THE NAVY has presented a flag to the Instrumentation Laboratory directed by Professor C. Stark Draper, '26, in recognition of its design and development of the Polaris inertial guidance system.

(Continued on page 52)

Trend of Affairs

(Continued from page 50)

A Shock Front in Space

PRELIMINARY results from a plasma sensor aboard the Interplanetary Monitoring Platform (IMP) satellite have confirmed that plasma emitted by the sun flows around the earth and the earth's magnetic field setting up a shock front—in much the same way that high-speed air does as it flows around a blunt object in a supersonic wind tunnel. These results were reported in March at a Goddard Space Flight Center symposium by an M.I.T. group that included Herbert S. Bridge, '50, Alberto Egidi, Alan J. Lazarus, '53, and Ervin F. Lyon, 3d, '59, of the Laboratory for Nuclear Science; and Richard H. Baker, '53, and Lynn A. Jacobson, '59, of Lincoln Laboratory.

The IMP was launched from Cape Kennedy last November with several scientific experiments aboard. It is in a highly elongated orbit which carries it out to 31 earth radii at its most distant point, and more than 30,000 measurements now have been made of the energy, density, and direction of low-energy charged solar particles in space.

Three distinct regions have been observed on each orbit. The inner region, corresponding to the earth's magnetic cavity, is characterized by an absence of low-energy plasma. It extends about 10 earth radii in the direction of the sun. The second region, the "shock" region, contains hot turbulent plasma. The outer boundary of this second region marks the transition between "supersonic" and "subsonic" flow and is the shock front. In the third, or outer, region the plasma is relatively mono-energetic, with a velocity directed away from the sun. The observed particle densities and velocities indicate a "supersonic" flow out there relative to the earth. The shock front falls about two earth radii outside the boundary of the inner region along the earth-sun line. The distance between the two boundaries increases to eight to 10 earth radii at right angles to the earth-sun line.

To Combat Unemployment

RICHARD S. WHITE, '48, President of Automation Engineering Laboratory, Inc., in Stamford, Conn., is advocating the creation of a "Fund for the Unemployed" by taxation of overtime pay. He has proposed that workers continue to be paid 150 per cent of their regular pay for overtime work, but that 25 per cent be withheld from them and put in this fund. Similarly, employers would be required to pay 25 per cent of a man's regular pay into the fund whenever that man worked overtime.

This fund, Mr. White suggests, could be used to provide food and other aid for the children of the unemployed, help find "uses" for idle workers, and provide all people with guidance toward expanding opportunities. His plan, he contends, would both make overtime work less attractive and help to alleviate the hardships of unemployment.

He presented this plan at a conference at Yale on automation last March and later this spring in Washington.

(Concluded on page 55)

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Trend of Affairs

(Concluded from page 52)

Course IX: Psychology

THE Executive Committee of the M.I.T. Corporation has approved the establishment of a Department of Psychology within the School of Humanities and Social Science, to be designated as Course IX, the numeral formerly assigned to General Science. Professor Hans-Lukas Teuber will head the Department, which builds upon a long history in the teaching of psychology at the Institute as an elective subject. Professor Teuber came to M.I.T. from the New York University Bellevue Medical Center and under his leadership the Psychology Section has experienced vigorous growth. The undergraduate teaching program has been enlarged, and enrollment in the introductory subject has increased from 277 in 1959-1960 to 683 in 1963-1964.

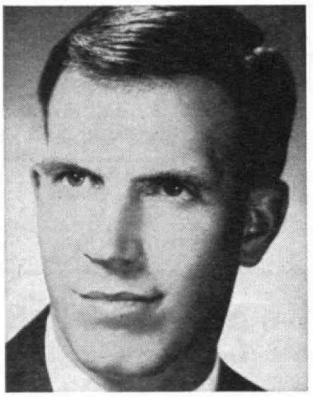
In the spring of 1962 the Faculty and Corporation approved plans for a doctoral program, and the first graduate students were admitted that fall. At the same time, extensive remodeling of the former Cenco Building was completed, making available greatly expanded research facilities, including laboratories and animal quarters, a library, seminar rooms, and staff offices. The staff in the Department now numbers 39, including a Faculty of nine. Fifteen graduate students are enrolled in its doctoral program.

In addition to its own research activities, the Psychology Department is engaged in a number of collaborative efforts with other departments and centers around the Institute. Laboratories at M.I.T., hospitals, and other institutions are participating in this work.

Unrestricted Corporate Aid

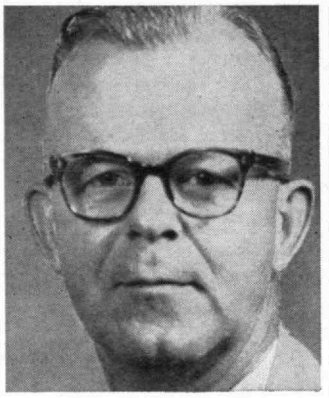
THE $500,000 distributed to 692 colleges and universities by the Gulf Oil Corporation this year included a $2,291 grant to M.I.T. These grants under the corporation's Aid-To-Education Program are based on a formula in which the quality of the school's curriculum, the effectiveness of its program, and financial support by its alumni, are factors.

These 4 Mass Mutual men achieved outstanding success in their first full year!



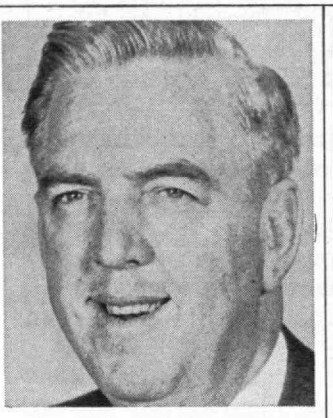
Ned G. Patrick, II

A '60 graduate of Dartmouth College, he joined our Omaha Agency of which his father is General Agent, in December, 1962, immediately following military service as a lieutenant in the Infantry. Honored as Mass Mutual's First Year Man of the Month for October '63, he placed over $50,000 in each of the last nine months and is first year leader not only in volume but in lives with 81.



Marion E. Marshall

Owner and operator of a funeral business for twenty-three years, he joined the Mattoon Agency in August, 1962. He was honored as First Year Man of the Month in March '63. He was second among the first year men for 1963 and 51st among all Mass Mutual agents in lives. He exceeded $30,000 in ordinary new business in each of the last 16 consecutive months.



Gordon E. Bergstrom

A graduate of the University of Minnesota, and a Bishop in the Mormon Church, he held a series of key posts in aero-space engineering for 15 years before joining our San Jose Agency in August, 1962. Last December he completed 15 consecutive months of more than $30,000 ordinary production, and was honored as First Year Man of the Month in July '63.

John B. Boyd

With 10 years of experience in the construction supplies business, he joined our Springfield Agency in March '62. Producing almost a quarter of a million in his first three months, he was honored as First Year Man of the Month in May '62 and as Second Year Man of the Month in October '63. He now has 22 consecutive months of over $30,000 of new business each.

Less than two years ago, these men were asking themselves a question you may be asking yourself today.

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If you are concerned about your rate of progress in your present job, and are interested in learning more about an opportunity with Mass Mutual, write a personal letter to Charles H. Schaaff, President, Massachusetts Mutual Life Insurance Company, Springfield, Mass. This organization has a record of over a century of dynamic growth and over $2.9 billion in assets. There's always room for a good man at Mass Mutual.

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Some of the Eastern Group Alumni in the Massachusetts Mutual Service:

M. I. T.
Lyman L. Tremaine, C.L.U., '23, New York
Harold G. Ingraham, Jr., C.L.U., '49, Home Office

Lehigh
Russell E. Hoaster, C.L.U., '31, San Antonio
Edward Billstein, Jr., '40, Atlanta
R. Lester Dodson, Jr., '44, New York

Lafayette
David B. Adler, C.L.U., '17, Orlando
Frederic F. Lawall, '22, New York
David K. Aldrich, C.L.U., '38, Allentown
Frank W. Hiller, '43, Philadelphia
Richard A. Faust, '56, Binghamton
Aman M. Barber, Jr., C.L.U., '59, Allentown
Cameron D. Warner, '61, Bethlehem

MASSACHUSETTS MUTUAL
Life Insurance Company
SPRINGFIELD, MASSACHUSETTS · ORGANIZED 1851

Club News

Washington Alumni Hear Transportation Specialist

At its January and March meetings, the M.I.T. Club of Washington continued its current practice of relying on prominent local Alumni as speakers and had scheduled another such alumnus as speaker for its April meeting. On January 28, C. Darwin Stolzenbach, '35, Administrator of the National Capital Transportation Agency, told 80 Alumni and guests assembled at the Cosmos Club about progress in mass rapid transit throughout the world. He discussed changes in mass transit and showed that many cities, particularly those in foreign countries, are building new rail systems or expanding existing ones. Within the United States he pointed to voter approval of a massive bond issue by residents of San Francisco for construction of a rail rapid transit system in that city. Mr. Stolzenbach's illustrated address was his first formal speech since June 13 when he became the focal point of a dispute that stemmed from his recommendations against freeway projects. In the January 28 speech Mr. Stolzenbach defended his advocacy of a modern steel rail rapid transit system for Washington. As usual when Mr. Stolzenbach speaks his remarks received prominent coverage in the Washington papers. Last December 9 the House of Representatives turned down a bill which would have provided for construction of a rail rapid transit system for Washington but Mr. Stolzenbach's agency is now preparing a new proposal for consideration by Congress at the present session. Richard R. Martin, '45, was event chairman for the January 28 meeting.

On March 12, 86 Alumni and guests were present for the dinner meeting at which J. Herbert Hollomon, '40, Assistant Secretary of Commerce for Science and Technology, spoke on "Science, Technology, and National Policy." The occasion was also Dr. Hollomon's 45th birthday, and those present helped Dr. and Mrs. Hollomon celebrate the occasion by providing a birthday cake with "magic" trick candles to illustrate one of the "uses of technology." The candles were difficult to blow out and would then reignite after a short period.

In his speech, Dr Holomon discussed the impact of automation and the need for retraining men to fill the new jobs created by automation in offices and factories. He stated that technological change was so rapid that we must think in terms of continuously retraining our manpower. He analyzed the problem of hard-core unemployment in depressed areas and stated that the United States was trailing other countries of the world in providing subsidies or tax relief to induce industry to locate in areas of chronic unemployment. As a related measure Dr. Hollomon called for consortiums of industry to construct entire new cities and said that "city-building" should itself be a major industry. Following the formal talk the audience participated in an extensive question period which was eventually terminated because of the lateness of the hour. Robert B. Riley, '54, event chairman for the March 12 meeting, was assisted by Dan R. McConnell, '61, and his wife, Sharon, who took reservations for this event.

For the April 29 meeting, the club had received word that William C. Foster, '18, director of the U.S. Arms Control and Disarmament Agency, had agreed to speak. A talk by Mr. Foster scheduled for an earlier date was postponed because of the arms control negotiations which have been in progress at Geneva for several months. Arrangements for the April 29 talk were concluded when Mr. Foster returned to this country in March in order to confer with President Johnson on the progress of negotiations. Robert Riley is the event chairman for this meeting also.

In addition to holding dinner meetings, the M.I.T. Club of Washington has also been active in other endeavors. The club has been assisting Douglas G. F. Haven, '52, Director for Regions for the Alumni Fund, in recruiting chairmen, vice-chairmen, and solicitors for the 1963-1964 alumni fund drive. All seven regions in the Washington area are now staffed, and Mr. Haven in a letter to Sterling H. Ivison, Jr., '41, past president and club coordinator for the alumni fund, stated, "if the Washington Club area continues on this path it will out perform all other club areas in the world." Lieutenant Colonel M. S. Hochmuth, 50, Commandant of the Harry Diamond Laboratories, is coordinating the establishment of a placement activity for the M.I.T. Club of Washington. After correspondence with the Placement Office at Cambridge it has been decided that for the present such activity will take the form of counselling and exchanging ideas on the most effective means of job placement and career advancement. Harris Weinstein, '56, now a practicing attorney, is corresponding with Frederick G. Lehman, '51, Secretary of the Alumni Association, regarding the tax-exempt status of the Alumni Association and its branches (local clubs) in relationship to the tax-exempt status of the M.I.T. Corporation. The question arose from discussions of whether the Washington Club should orient its bylaws toward the D.C. statutes relating to membership organizations or should consider itself an integral part of the Alumni Association and therefore governed by applicable Massachusetts law.—Paul M. Robinson, Jr., '44-2, President, 8009 Jansen Drive, Springfield, Va., and Richard R. Martin, '45, Secretary, 9308 Milroy Place, Bethesda 14, Md.

Future M.I.T. Club Meetings

Following are the dates and principal speakers as announced at the time of printing for M.I.T. club meetings during May and June, 1964. For more details consult the club secretary in your city.

May 4—Pittsburgh—Gulf Research & Development Laboratories
Secretary: Eli I. Goodman, '50, Westinghouse Electric Corporation, Astronuclear Laboratory, P.O. Box 10864, Pittsburgh

May 5—Pittsfield—Professor Herbert M. Teager, '52
President: Harry Kalker, '23, Sprague Products Corporation, North Adams

May 8—Portland, Maine—Professor Robert S. Harris, '28
Secretary: Robert A. Lindquist, '51, Atlantic Bearing Corporation, Portland

May 11—M.I.T. Alumni Center of New York—Engineering The World's Fair, General William Whipple, Jr.
Executive Secretary: James N. Phinney, United Engineering Center, 345 East 47th Street, New York

May 12—Providence—Professor Charles E. Holt, 3d, '62
Secretary: Arthur N. Verrier, '46, 89 Fostmere Court, Warwick

May 12—Los Angeles—Program to be announced
Secretary: Arthur Schwartz, '47, 8355 Blackburn Avenue, Los Angeles

May 14—Boston—Professor Robert R. Shrock
Secretary: John M. Reed, '51, Room 831, 73 Tremont Street, Boston

May 16—Philadelphia—Dean Jerome B. Wiesner
Secretary: John B. Murdock, '41, The Perlite Corporation, Lansdowne

May 21—Newark—Program to be announced
Secretary: Roman H. Chapelsky, '53, 329 Rosehill Place, Elizabeth

May 25—M.I.T. Alumni Center of New York—Supersonic Transport, Professor Secor D. Browne, Moderator

June 15—Alumni Day at M.I.T.

GEOGRAPHICAL distribution of M.I.T. Clubs in the United States shows 73 clubs and associate organizations located in 34 states and Washington, D.C.

M.I.T.-Simmons Alumni Meet on Long Island

Fifty M.I.T. and Simmons alumni of Long Island, their wives and husbands, met for dinner at the Candlelight Restaurant in Roslyn on February 23. James N. Phinney, executive secretary of the M.I.T. Alumni Center of New York, told us about the plans of the Center, and Hugo Wikstrom, '50 suggested that we eat lunch at the Tech Club. Jack Sherman, '31, was chairman.

Samson Berman, of Samson Berman Associates, Inc., explained the difference between an interior designer and an interior decorator. The interior designer must get to know his clients well enough so he can design an interior they will not tire of. He claims he can keep them from changing their minds when the job is half done. William B. Terry, Jr., '43, discussed getting our money's worth when we build a house.

The annual meeting, approximately May 8, will feature some phase of the moon program.—Douglas A. Tooley, '28, Secretary, 11 Cider Mill Lane, Huntington, N.Y.

Northern California Group Learns About "Sketchpad"

The M.I.T. Club of Northern California heard Professor J. Francis Reintjes, Director of the M.I.T. Electronic Systems Laboratory, describe Project "Sketchpad" at a meeting held in a downtown San Francisco Japanese restaurant. The cuisine was complete from sukiyaki to saki—and served in the traditional Japanese style with the group on floor cushions.

Professor Reintjes showed a movie describing "Sketchpad," Lincoln Laboratory's development which some day may replace the mechanical draftsman with the computer. He foresees a time when a computer will not only prepare the mechanical drawings, but will directly instruct the automatic manufacturing machines to manufacture the item. Richard A. Osborne, executive officer of the Electronic Systems Laboratory, was also a guest.

New club members should contact the club secretary-treasurer.—Roger S. Borovoy, '56, Secretary-Treasurer, Patent Counsel, Fairchild Semiconductor, P.O. Box 880, Mountain View, Calif.

Orlando Alumni Consider Technology in Turkey

The M.I.T. Club of Orlando held its spring meeting on March 4 at the Orlando Country Club. Wives were invited, and Edwin S. Burdell, '20, explained "Teaching Technology in Turkey." The talk was stimulating and timely in light of the current problem on Cyprus.

Dr. Burdell became Dean of Rollins College in Winter Park in 1963, after serving as acting president of the Middle East Technical University, Ankara, Turkey, from its inception in 1959 through 1962; as president of Cooper Union in New York City, 1938 to 1959; and as Dean of Humanities at M.I.T. previously.

The members welcomed Joyce Tyra into the group. Joyce and Don Tyra, '59, were married December 12, 1963. Pete Hand, '48, reported progress of the current Alumni Fund drive, and Hugh Schwartz, '42, discussed activities of the Educational Council in the Central Florida area. Worthy of special note was a successful seminar with high school counselors of the area on December 2 led by M. Bryce Leggett, '40, of the Admissions Office.—Loris M. Hailey, '50, Secretary, 5510 Davisson Ave., Orlando, Fla.

Boston Club Hears Prof. Glenn Williams, '42

A great many significant changes are taking place at M.I.T. not only in education but in engineering research. On March 12 the M.I.T. Club of Boston met at the Union Oyster House to hear Glenn C. Williams, '42, Professor of Chemical Engineering at M.I.T."—John M. Reed, '51, Secretary-Treasurer, Room 831, 73 Tremont Street, Boston, Mass.

South Texas Club Hears M.I.T. Astronauts

Alumni and wives of the M.I.T. Club of South Texas met at the Memorial Drive Country Club, Houston, Texas, on March 3. Guests were the three new M.I.T. astronauts: Major Edwin E. Aldrin, Jr., '63; Russel L. Schewickart, '56; and Captain David R. Scott, '62; and their wives. The dinner coincided with the astronauts' one-month anniversary of becoming associated with the NASA Manned Spacecraft Center at Clear Lake, adjoining Houston.

Using slides, the astronauts described the objectives and some of the techniques involved in the Gemini and Apollo space programs. Major Aldrin explained that the Gemini two-man spacecraft will develop rendezvous techniques and (in contrast with Mercury) will have a maneuvering capability enabling it to change orbit. Mr. Schweickart and Captain Scott discussed the Apollo three-man spacecraft which will rendezvous in lunar orbit and which will carry the Lunar Excursion Module (LEM) to land on the moon. Apollo will make use of a lunar midcourse correction navigational technique developed at the Institute.

Newly elected club officers are: Glen V. Dorflinger, '46, president; Arnold M. Singer, '44, vice-president; Edwin A. Reed, '45, secretary; and Joseph F. Moore, '52, treasurer.—Edwin A. Reed, '45, Secretary, 6243 Briar Rose, Houston 27, Texas.

Stein Club's Topic Is Art Forgeries

The Boston Stein Club held a mid-season dinner on March 18 at the Faculty Club and heard an illustrated lecture, "The Examination of Works of Art and the Detection of Forgeries," by William J. Young, Director of the Research Laboratory of the Boston Museum of Fine Arts. Dr. Young was trained at Oxford and has been associated with our Museum since 1930, at which time he established the Laboratory. To the scientist in the arts the visual examination of an object of art may be merely the prelude to an involved bit of research with techniques and instruments of modern physics—which may make Sherlock Holmes' deductive processes appear amateurish. The results of this research may turn up significant data of an ancient civilization, or expose a forged copy of an old master.—Mel A. Barkan, '55, Secretary, 10 Emerson Place, Boston, Mass.

Norway M.I.T. Club Hears Swedish Banker

The M.I.T. Club of Norway and the Harvard Business School Club of Norway held a joint meeting last November. Marc Wallenberg, Jr., president of Sweden's third largest bank, was speaker. About 60 members, half from each club, attended. Excepting very personal meetings, such as the one with Lawrence J. Heidt, Associate Professor of Chemistry, this was the most successful regular meeting we have had.—Andreas Wessel, Jr., '52, Secretary-Treasurer, c/o Firma Weswitco, Olaf Schous vei 4, Oslo, Norway.

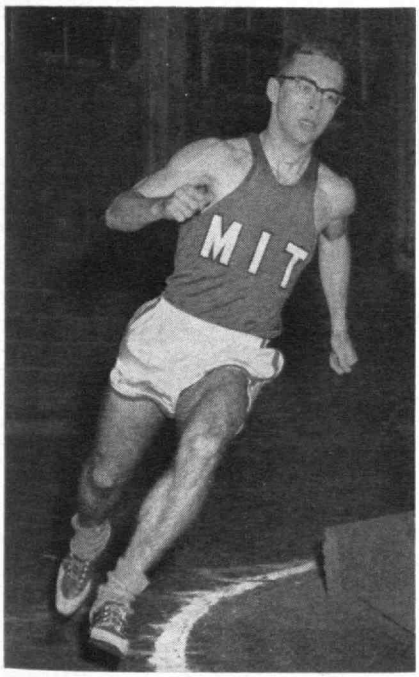
Spring Teams Chosen as Winter Sports Season Ends

Spring tryouts for seven varsity teams at M.I.T. found more than 200 candidates vying for positions. Seven returning lettermen, led by Dave Dunford, '64, head the baseball team; and crews, lacrosse and tennis teams got off to enthusiastic starts with lettermen and up-and-coming sophomores and juniors rounding out the squads.

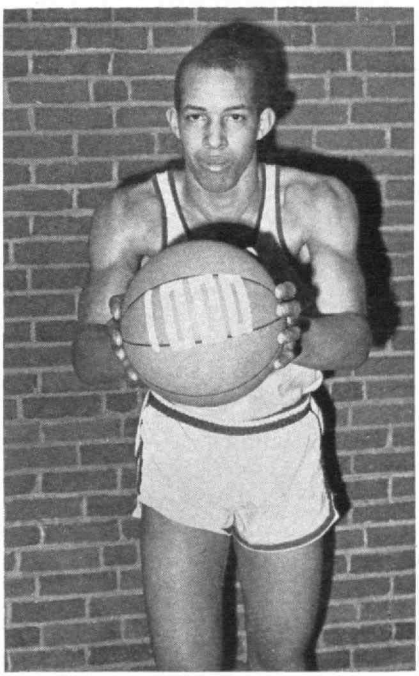
The end of the winter sports season was signaled March 24 by the award of ten awards for outstanding athletics by the "T" Club, undergraduate letterman's club. Among the recipients were W. Sumner Brown, '66, potentially the best runner ever to attend M.I.T.; Mike Williams, '64, top-seeded 157-pound wrestler in the New England Intercollegiate Wrestling Championships; and Bill Eagleson, '64, co-captain of the basketball team and record-breaking scorer (1058 points in 67 games).

Eagleson and Co-captain Jack Moter, '64, led the team in an impressive season which began with the winning of the first five games, against Boston State, Trinity, Wesleyan, Brandeis, and Norwich. The quintet was heartened by a great surge of enthusiasm from the M.I.T. community, as home game attendance soared.

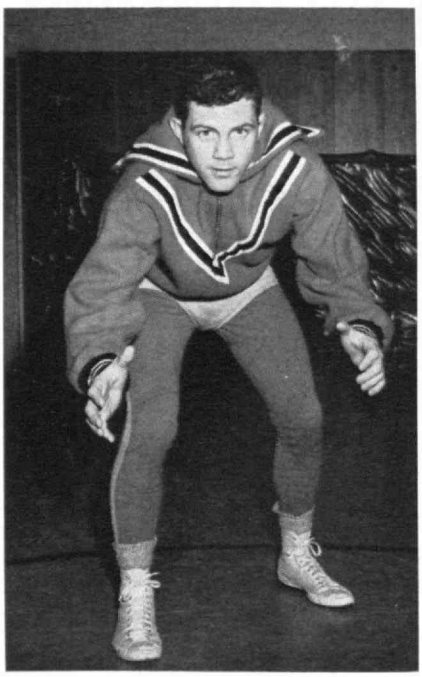
Joe Kirk, '64, Captain of the 1963-1964 M.I.T. hockey team was one of the hardest workers on the Tech Squad. Kirk played in all the 16 M.I.T. varsity contests and was credited with 555 saves.



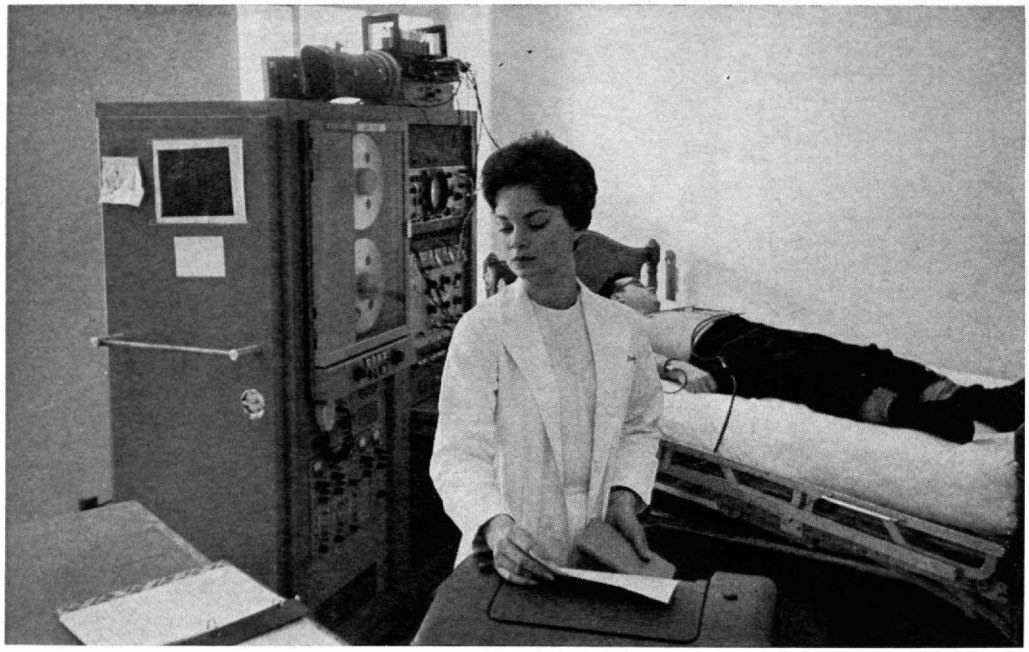
Sophomore distance star W. Sumner Brown, '66, broke four M.I.T. indoor records and this winter established a new M.I.T. record of 4:19.7 at the Intercollegiate Indoor Track and Field meet at Madison Square Garden.



Senior Co-Captain Bill Eagleson broke the all-time M.I.T. career scoring mark of 946 and became the first Tech player to score over 1000 points. The team played its second greatest season ever, winning 16 of 24 games.



Wrestling Captain Mike Williams, '64, was undefeated in 12 season matches (1 tie) and top-seeded in his weight class in the N.E. college championships. However, he sustained an injury just prior to that tournament.



When Doctors and Engineers Get Together . . .

More and more the medical profession is finding in technical disciplines the assistance it requires to gain its advanced objectives. Many researchers at M.I.T. are working on ways to assist the medical profession. Their work is helping to develop and improve such modern tools as:

Pediatric respirators
Sensory aids for the blind
Lasers for surgical uses
Heart-lung machines
Innovations in nutrition
Electronic diagnostic aids (see picture)

Hear the moving story of M.I.T.'s contributions to medical progress—the coming together of the physical and medical sciences —at your Alumni Day program, June 15, 1964.

Further details and reservation material will be sent to those requesting them.

Class News

'95

The Boston Sunday Advertiser of January 9 gave us this item about our classmate **Thomas H. Wiggin,** whose passing we noted in last month's notes: "A big barrel-chested man, he used to swim a quarter-mile a day down Five Mile River to Long Island Sound. He was a native of Malden, Mass., lived in Scarsdale, N.Y., and spent his summers in Norwalk until he moved here permanently about 13 years ago."

If you failed to read in Fortune last September and later fall issues President **Alfred Sloan's** "My Years with General Motors," you should read, in the March Technology Review, "A Contribution to the Sciences and Art of Management," which shows pictures of the author and his family.—**Andrew F. Fuller,** Secretary, 120 Tremont Street, Boston, Mass.

'96

The class sent a congratulatory message to **Walter Leland** on March 13, his 88th birthday; he continues to be our youngest member. Last January he was in good physical condition after several coronary disturbances; he goes to the office a couple of times a week even though his loss of eyesight limits his efficiency. . . . **Harold Boardman**'s 90th birthday was March 31, as noted in the March Review; he too was sent a congratulatory letter. On last account he was quite able to be about and attend to his many interests; he was learning about many things his engineering courses did not teach. . . . The December issue of Midwest Engineer presents comments from and about **William David Coolidge.** "Renowned physicist, he is one of the most distinguished alumni of M.I.T., from which he was graduated in 1896. He received the Award of the Western Society of Engineers in 1932."

Traveling is certainly educational. Travel greatly increases one's respect for the achievements of others, especially those of an earlier age. For example, think of the Mayan civilization without metal tools, without beasts of burden and without the invention of the wheel, producing large and impressive stone buildings. What perhaps is still more impressive is that with nothing but lines of sight, they made astronomical observations which gave them a determination of the time taken by the earth to make its circuit around the sun, accurate to within two ten-thousandths of a day. Or, take for example, the Temple of Jupiter at Baalbek in Lebanon with its great cylindrical columns of granite, coming from Aswan. These were floated on rafts 1,200 miles down the Nile and across the eastern Mediterranean to Tripoli, and then rolled from there 150 miles, up hill and down, to Baalbek over parallel walls built for the purpose—three years for transportation alone. . . . A new book by Alfred P. Sloan, Jr., '95, published by Doubleday in 1964 is in the archives at the Hayden Library, where it may be consulted, but only on the premises. Just a few minutes spent reading the first chapter about the pre-Sloan era will convince one that the rest must be read.—**James M. Driscoll,** Secretary, 129 Walnut Street, Brookline, Mass.

'97

This month there is to be reported both good and bad news. The first comes from a Des Moines, Iowa, publication in an article headed "90 Years of Quality,"; it is an outline of the career of **Jay Tone, Sr.,** "68 years with Tone Brothers, purveyors of spices, extracts and flavors." The article appeared last September and covers too much space to be quoted verbatim. It tells that Jay is the president and in the office every day. My sadness comes from the fact that this Course X man has shown so little interest in M.I.T. affairs. May he long continue his presidency. . . . My second item of good news is a letter from **Ed Hawkins,** who continues in good health at Hingham, Mass. His two sons, Dick and Ed, are both M.I.T. alumni, Classes of '27 and '30, respectively. Ed sent a brief, all-too modest account of his career with the Pennsylvania Steel Company, M. D. Knowlton Company and Kodak. More of my correspondence with him and **Frank Feeley,** also Course II, another time.

The sad news is the loss in January of **Harry Ballou,** Course I. He requested a minimum of publicity concerning his departure. He left a wife and son and a material estate much of which is to go to M.I.T. for increased faculty salaries on the death of his wife. Several months ago I outlined in these notes my connection with him, together with **Frank Shepard** and **Ben Howes,** on the occasion of the 50th Reunion at Osterville. . . . Last August we lost **"Billy" (William R.) Wood,** Course XIII, of Richmond, Calif. He left a daughter and two sons. He was for a time, with Union Iron Works in San Francisco. More concerning "Billy" another time.—**George R. Wadleigh,** Acting Secretary, 70 Flower Avenue, Hastings-on-Hudson, N.Y.

'98

Our call for class notes is bringing results. Under date of February 22, 1964, **Bob Lacy,** Course 1, writes among other things: "I am secretary of my Johns Hopkins University Class of 1896. There are nine of us left out of sixty odd. Last night we had the annual alumni banquet with the giving of a four-foot check for $425,000 from the 13,000 alumni. The president, Dr. Milton Eisenhower, spoke most interestingly about Panama. Among other things, he said the U.S. ambassador to Panama should be the head man, with the governor of the Canal Zone only an adviser. The U.S. has jurisdiction but no sovereignty. Within 20 years the present canal will be obsolete and a new sea level canal built." More personally, Bob writes that he and his wife will be flying, around the last of May, with a group to Lisbon for a 20-day tour in Portugal, Spain and Morocco. As Bob states, he was an 1896 graduate of Johns Hopkins before coming to Tech. As secretary of that class, he appreciates the importance of notes from individual classmates. From him came the first reply to our call. Thanks, Bob, for your co-operation. . . . We have just received a letter from **Al Davis** with some more notes. A little too late though, Al, for May but you and our other classmates will see them in the June issue of The Review. Thanks too, Al. It will be good to receive news from others.

Professor **Arthur L. Goodrich,** Course X, has forwarded his new address as 1441 East Ramon Road, Palm Springs, Calif. . . . We regret to report the passing of our classmate **David C. Fenner** on January 31, 1964. We who were at the 65th Reunion at Cambridge and at Babson Park will remember him as one of us at that time. He was loyal in attending our reunions and was always full of fun and, needless to say, will be very much missed at future gatherings. We quote a clipping in The New York Times of February 3, 1964 (a Monday): "Falmouth, Mass. David C. Fenner, a former vice-president of the old Mack-International Motor Truck Company, died Friday in the Royal Megansett Nursing Home here. His age was 88. For many years he had lived in New

Happy Birthday

During May two Alumni will celebrate their 95th birthdays; and 4, 4 and 11 Alumni will celebrate, respectively, their 90th, 85th, and 80th milestones, as listed below with dates of birth.

May, 1869—WELLES BOSWORTH, '89, on the 8th; and DELIA M. O'CONNELL, '96, on the 24th.

May, 1874—CHARLES G. HYDE, '96, on the 7th; STUART A. COURTIS, '99, on the 15th; PAUL R. BROWN, '96, on the 24th; and CLARENCE GOLDSMITH, '98, on the 29th.

May, 1879—CLAYTON M. SIMMERS, '05, on the 1st; ALFONSO MADERO, '01, on the 3rd; CHARLES F. GARDNER, '02, on the 14th; and LEROY L. THWING, '03, on the 28th.

May, 1884—HERBERT W. CUMMINGS, '10, on the 1st; ANDREW W. HULL, '07, on the 4th; HERMAN T. GAMMONS, '05, on the 6th; DANA W. CLARK, '08, on the 8th; STEPHEN KEARNEY, '06, on the 10th; HAROLD W. BEERS, '06, on the 11th; CHESTER A. BROWN, '08, on the 13th; KEYES C. GAYNOR, '09, and C. ROSS LITTIG, '06, on the 23rd; CHARLES D. MCCORMICK, '12, on the 24th; and WILLIAM L. SPALDING, '05, on the 28th.

York City and had a summer home in Falmouth. During both world wars and the Korean war Mr. Fenner aided the government on problems of automotive industry production. A former president of the American Society of Mechanical Engineers, Mr. Fenner was a founder and former president of the Automobile Old Timers Association and a former director of the Greater New York Safety Council. He had also been president of the Automobile Merchants Association of New York, Inc., secretary of the Automobile Safety Foundation, and chairman of the Motor Vehicles Conference of the Associations of the Automobile Industry. He was graduated from the Sheffield Scientific School of Yale University in 1896 and M.I.T. in 1898. A daughter, Mrs. Thomas B. Gresham, survives.

The address we have for Mrs. **Helen S. Parker** has been for several years, The Boston Trust Company at 100 Franklin Street, Boston, Mass. On recent inquiry to this company, we were informed that she died in Bath, England, on February 17, 1963. No further information was available. Some of us may remember her as **Helen Schlesinger,** a student in Course VII. . . . The trustees of the Gravity Research Foundation of New Boston, N.H., (founded by **Roger Babson**) have announced the recipients of awards for essays for 1963 as follows: 1) $1000. "Gravitational Stability of Large Masses" by Joseph W. Weinberg and Gerald E. Tauber, Western Reserve University, Cleveland, Ohio; 2) $300. "Ultracold Neutrons and Their Potential Value in Gravitational Research" by Robert L. Forward, Hughes Research Laboratories, Malibu, Calif.; 3) $200. "Scalar Gravitation" by Marcel Wellner, Indiana University, and Guido Sandri, A.R.A.P.; 4) $150. "Gravitation and Mass Through Gauge Invariance" by F. Englert and R. Brout, Free University of Brussels; 5) $100. "Gravitation and Electromagnetism" by Jovan Djuric, University of New Mexico.

Your secretary keeps very busy and the days are not long enough for accomplishing all that might be done. Right now he is writing the histories of many old houses in Needham, Mass. (his home town). This work was started a few years back and the end is not in sight. The write-ups are being published as feature articles in a local Needham paper. Every February he is host at a birthday dinner party for all his family, five members of which were born in that month. The recent party was held at the Pillar House in Newton, Mass., on February 22, 1964; 15 relatives were present including one member of the family from Orange, N.J. —**Frederic A. Jones,** Secretary, 286 Chestnut Hill Avenue, Brighton 35, Mass.; **Edward S. Chapin,** President and Class Agent, 271 Dartmouth Street, Boston 16, Mass.

'99

Miles, Hervey and I wait patiently for the report of the Alumni Association of those who expect to attend the Alumni Day on June 15, which is also the 65th Reunion of our class. The secretary will watch every mail hoping to receive the list of your past and present interests which he has urged everyone to send to him, so that a synopsis may be prepared to be mailed to the entire class. There will be buses to take you to the new buildings and laboratories, which with the president's address at the noon luncheon in the tent will gladden the hearts of all at the vigorous growth of our wonderful institute. The class will have a special table. Although everyone is over 85, our physical and mental agility will be a pleasant reminder of the ability of '99 to gracefully "carry on" interesting and useful lives.—**Percy W. Witherell,** Secretary, 1162 West Street, Wrentham, Mass. Telephone 617-3164

'01

Charles Auer, I, III, El Paso, Texas, writes: "Enclosed find my dues for 1964. Thanks for the letter about our 1901 class. I am going on 85 next September. Am fairly well except for weak knees and legs. Still attend to some business but not a great deal. Regards." . . . From **Phil Moore,** II: "Your annual report and request for news reached me recently. The bank account seems to be in pretty fair shape, but we must keep it that way. Enclosed check will help. The appeal for news poses a problem that no doubt other members of the class feel, too. What do we old boys have to say that is interesting? Very little in my case and all so sort of personal that we hesitate to send it in for general publication. I have looked over our own class notes and those of other classes of about our time and find that the only content is personal experiences and they are of interest to our old associates I presume. This letter is written from Nokomis, Fla. The resort where we are staying is the same one that we have visited for the past five years. Travel is no longer easy any way you travel. I think driving is the most convenient, and I don't care too much for the hazards of the road. So perhaps if I did not have an energetic partner I might turn into a stay-at-home. We are both well."

S. W. St Clair, IV, Ojai, Calif.: "In 1961 I retired from my job as president of Sturgis Associates, Inc. (architects) after 54 years of service with that organization, mostly in Boston but also Miami, Chicago and New York. Since retirement I have lived in Southern California. It is a delightful country filled with wonderful scenery—mountains, deserts, valleys, canyons etc. Clear sunny days almost all the year. It is a most interesting place to live. However, I like Southern Florida slightly better. The tropical conditions, jungles, palm trees, flocks of tropical birds, the rich natural growth everywhere furnish more of interest to me than the rather dry and arid foliage of Southern California. All sections of this world are fascinating—too bad that we cannot live long enough to see it all." . . . The replies to the Class Letter are beginning to come in. Keep it up if you want class notes. What seems trivial to you will always be interesting to your classmates.—**Theodore H. Taft,** Secretary, Box 124, Jaffrey, N.H.

Deceased

WILLIAM R. WOOD, '97, Aug.*
DAVID C. FENNER, '98, Jan. 31*
MRS. HELEN C. PARKER, '98, Feb. 17, 1963*
WALDO TROWBRIDGE, '04, March 7*
ALFRED H. KELLING, '05, July 28*
G. C. W. WHITING, '05, July 28*
WILLIAM COUPER, '06, Feb. 15
EDGAR C. STEINHARTER, '06, Dec. 10*
PERCY E. TILLSON, '06, Feb. 2*
BERTHA I. BARKER, '07, Nov.
WESLEY T. JONES, '11, Dec. 23*
ABRAHAM SHOHAN, '11*
ROBERT S. THURSTON, '11*
GUY W. TRUE, '11, Feb. 13
DONALD DESGRANGES, '14, Feb. 21*
HAMILTON HARLOW, '14, Jan. 21*
HOWARD S. WILLIS, '14, Dec. 6*
FRANCIS P. SCULLY, '15, Feb. 21*
ROBERT M. BLACKALL, '17, Dec. 30*
V. BRUCE DAVIS, '17, Jan. 17
FUMIO ODA, '19
W. KENNETH PIKE, '19, Jan. 25, 1963*
HELAND J. GREEN, '20*
EDWARD ROLLE, '20*
EGON E. KATTWINKEL, '23, March 1
JOHN M. KECK, '23, Jan. 28*
STANLEY P. FOSGATE, '24, July 8, 1962
HARRY E. COOPER, '25, July 22
RALPH W. LEWIS, '25, March 3
ALEXANDER A. NIKOLSKY, '29, Feb. 15
JAMES G. BOWEN, '30*
MRS. E.R. JETTE, '30, Jan.*
B. JOHN KINIVY, '31, Jan. 21, 1963
DON N. HIGGINS, JR., '33, Aug. 2
BURDETTE W. HOLMES, '41
ALFRED R. LICHTEN, '46, Nov. 17
GARLAND A. WOOD, '47, Feb. 29

*Further information in Class News.

'03

As our class members advance in years, they seem to recede into serenity, judging by their lack of correspondence with your secretary. Hence, it seems opportune to reminisce about our 55th Reunion in 1958, after writing about our 50th celebration in the March Review. The 55th was celebrated in the Vermont Dining Room of the Sloan Building on Saturday, June 14 at 6:30 P.M. with seven members and four wives present; five more were expected but were unable to attend. **Ike Atwood,** II, presided and after every one had enjoyed a satisfying steak dinner, he called on everyone present for a brief account of his or her activities. The secretary read, in part, the report of the past 50th Reunion, and the group stood in silence for a moment in memory of **Fred A. Eustis,** our former secretary and treasurer. The result of the ballot for treasurer was announced, and **August H. Eustis** was appropriately and unanimously elected. It was also voted that the secretary have the authority to sign all checks on the class account should that need arise. Regrets were expressed that our new treasurer

could not be present at this time, on account of business engagements.

An illuminated Scroll of Appreciation from '03 members was then tendered to Mrs. Fred A. Eustis. Our program of entertainment included a graphic account of the recent trip to South America that Ike and Mrs. Atwood enjoyed, visiting Chile, Peru, Argentina, Brazil, and other neighboring cities. Professor **Andrey A. Potter,** VI, Dean Emeritus of Purdue University, had also been to Brazil on a government education mission and gave his impression of conditions outside the United States. He also elaborated on his association with the National Science Foundation; the Lafayette, Ind., Symphony Orchestra, and local dramatics. The meeting ended with farewells by all present, loathe to depart after such touching recollections of dear old Rogers and its environment.

More recently, an interesting announcement for naval architecture devotees concerns a Yachting Seminar, demonstrating the tank testing of yacht hulls. This unique project, a brainchild of Walter C. Wood, '17, showed how models of 12-meter ocean racers and Olympic 55-meter racers are tested in a towing tank and the results analyzed. The towing tank used actual models and gave everyone present an opportunity to observe the response of the models under various water conditions, the data being recorded for each performance. A movie on the subject further dramatized the features of the tests. Our classmates can recall, our Water Carnival in town was not the picturesque Charles River of today, but the Swan boats of the Public Garden, nearby. . . . Our Happy Birthday congratulations go to **Arthur L. Derby,** who celebrated his 80th milestone on March 30. —**John J. A. Nolan,** Secretary, 13 Linden Avenue, Somerville, Mass.; **Augustus H. Eustis,** Treasurer, 131 State Street, Boston, Mass.

'04

Some of you may be getting bored with items about our 60th Reunion in June but since there is no other class news it is reunion or nothing. These notes are being written in March and you will not read them until May. Before that time we hope that those of you who have been undecided regarding attendance will have made up your minds to be there. Here are a couple of compromise suggestions. If living in a dormitory does not appeal to you there is no reason why you can't stay at a hotel or motel nights and use McCormick Hall for visiting with classmates. If the general reunion affairs do not interest you why not come to the official dinner at McCormick Hall on Sunday, June 14 at 1 P.M.? For those who definitely cannot attend, a letter of greeting for those in attendance would be very appropriate. . . . It is with regret that we close these notes with the announcement that **Waldo Trowbridge,** Course III, passed away at Bourne, Mass., on March 7, 1964. Your secretary recalls many pleasant chats with him as we worked at adjoining desks in fourth year class lab. Surviving members of his family have our deep sympathy.—**Carle R. Hayward,** Secretary, M.I.T. Room 35-304, Cambridge 39, Mass.; **Eugene H. Russell, Jr.,** Treasurer, 82 Devonshire Street, Boston, Mass.

'05

These notes are being written, unexpectedly, in Boerne, Texas, where Ruth and I are vacationing on the invitation of **Willard E. Simpson,** I, of San Antonio, the third largest city in Texas, about 30 miles south of here. The invitation arose partly from Willard's natural and exuberant nature, partly from his thinking that the climate of the Texas hill country would be beneficial to Ruth's arthritis. I am sure it will be and good for a poor tired retiree as well. Actually, after a complete organization of the March Red Cross Campaign in Sandwich, I had to dump the job of receiving and recording contributions into the lap of a willing substitute, just as we did last year when we left the same situation at about the same time. However, we went way "over the top" in 1963 and will again in 1964.

I found Willard hale and hearty, and at his office every day holding the reins and probably doing most of the work. Already I have discovered that for most of his life he has been a very important part of the civic and fraternal life of the city. He belongs to Rotary, is a 33rd-degree Mason, past-potentate of Alzafar Shrine, has been captain of both the Arab and mounted patrol and is known all over the state in Rotarian and Masonic circles. I could elaborate ad infinitum, but am limited by the size of The Review and his extreme modesty. Finally, he is a prince of a host, and I hope he can say along about May 1, that we have been appreciative guests.

I have just learned that **Alfred H. Kelling,** V, died on July 28, 1963, at Bethesda, Md. In an attempt to find at this late date an obituary from a local paper, I wrote to **G. C. W. Whiting,** I, of Baltimore, asking his help. I was shocked by his reply, stating his inability to be of service, due to the fact that he is blind. I seem to remember that he did write me briefly a while back of an impending misfortune in this area. I am sure that all '05 will sympathize with George in his misfortune. I assume from his letter that he is still chairman of the board of Whiting-Turner Contracting Company of Baltimore. . . . Among the interesting returns from my mailing of Christmas cards to '05 men (and women) was a letter written on the letterhead of **Mrs. Edward P. Ripley,** Secretary of the Class of 1896 at Smith College. She could not understand why she was included in 1905 records, but I was able to assure her that in our Ten Year Book she had recorded herself as having taken refresher courses in chemistry with '05. As I remember she was Miss **Edith Wheeler.** As a matter of fact, with this source of information, she is now the oldest member of the class.

I have had reactions about a 60th Reunion from just two men. **Bill Ball** recommends we try Cape Cod once more, spending Friday and Saturday before Alumni Day at Snow Inn in Harwichport, in combination with one or more M.I.T. classes, returning to Cambridge Sunday night or Monday morning for Alumni Day luncheon and dinner. He feels that by tying in the opportunity to go to the World's Fair, we could sell the combination to several living at a distance. The other suggests a full weekend at Cambridge, using one of the dormitories as headquarters. I am not attempting to take a poll over a year in advance, but I hope that if there are others who agree with Bill Ball, they make it manifest. It does not mean a commitment.—**Fred W. Goldthwait,** Secretary, Box 32, Center Sandwich, N.H.; **Gilbert S. Tower,** Assistant Secretary, 35 North Main Street, Cohasset, Mass.

'06

Except for a postcard from **George Guernsey** from Winter Park, the past month (to March 10) has been devoid of mail. Two deaths were reported, however. **Edgar Clifford Steinharter,** VII, M.D., was born September 8, 1883, in Cincinnati, Ohio, and died there on December 10, 1963, as reported by card to the Alumni Office. His home address was 692 Glenwood Avenue when he entered Tech from the high school, and roomed at Tech Chambers, being variously listed as '04 and '05 in Course VII, but got his degree with '06. He was a member of the Ohio Club and his thesis was "On Neutral Red as a Presumptive Test for the Colon Bacillus in Bacteriological Water Analysis." After obtaining his degree from Harvard Medical School he served at Boston City Hospital for a few years, becoming house officer; he returned to his home town by or before 1915 to practice there, at various addresses. He was in service for several years during W.W.I, being an "Examiner of candidates for 1st and 2nd ORC and for the Aviation Corps," lieutenant, MRC Base Hospital 76, Camp Devens, Mass., 11 July 1918 to September, 1918; A.E.F. 23 September, 1918 to 11 July, 1919, at Vichy and Camp Pontanezen." The doctor had never attended a reunion nor had any other contact so far as we know, but he contributed to the Alumni Fund in 1956.

In May, 1961, I had some interesting and helpful correspondence with **Bill Couper** and reported much of his career in the December, 1961, class notes. William Couper, I, S.B. was born in Norfolk, Va., November 16, 1884, and died in Lexington, Va., February 15, 1964. He graduated from Virginia Military Institute in Civil Engineering in 1904 and joined 1906 as a graduate student in our junior year. His thesis, with **George Burpee,** was "A Study of the Failures of Concrete Structures." Until 1917 he was in New York City with the Pennsylvania Railroad, secretary of the board of engineers in charge of construction, New York tunnels and terminal, and in various other positions of responsibility; he

left to enter service as a major in the Quarter Master Corps, soon becoming a lieutenant colonel. Without repeating much of what previously appeared, suffice it to say that during his busy life Bill somehow found time to write several books: one in 1912 on the New York tunnels and terminal; "The V.M.I. New Market Cadets" in 1933; and "Claudius Crozet" in 1936; a four-volume work, "100 Years at V.M.I.," in 1939; "History of the Shenandoah Valley," in 1952. He was active otherwise, too. In Washington he was a consultant to the War Department, 1940-1941, and to the Committee on Education, House of Representatives 1944-1945. He was treasurer, vice-president, and president of the Southern Conference from 1934 to 1948; president, 1934-1935 of the Association of Military Colleges and Schools of the U.S.; and president, the Rockbridge County Historical Society. By 1925 he was back at his alma mater, V.M.I., as executive officer and later became its historiographer, retiring in 1954. In 1920 he had been asked to prepare a long-range plan for the development of V.M.I. and that master plan has been carried out through the years with little or no change. As a consultant, he had a hand in the construction of several new buildings and the remodelling of others. The Big Day in the life of William Couper came on May 15, 1961, when an oil portrait of him was presented to the school. On October 9, 1912, he married Eloise Hirst and their children are Dr. John Lee and Virginia Hirst (Mrs. N. Dudley Johnson). Bill had concluded his last letter by reminding me that he had attended our 1946 reunion and hoped to be back in 1966. Why don't you plan to attend Alumni Day on Monday?, June 15, and send word to the secretary.—**Edward B. Rowe,** Secretary-Treasurer, 11 Cushing Road, Wellesley Hills, Mass. 02181.

'07

The appeal for class funds was a very rewarding experience, as it not only helped the class treasury but it brought in notes and letters from many of the class. Some of the men wrote me for the first time in many years. . . . Mrs. **Hudson B. Hastings** sent a note to me, enclosing Hud's dues. His eyesight has not improved, and his hearing is still badly impaired. He is able, however, to work around his home in Connecticut, both inside and out, and plays some golf when the weather is suitable. I have been doing business with Kenneth C. Lutz, of the Luria Company of New York. He was a student of Hud's at Yale and told me in what high regard all the students held Professor Hastings. . . . **Bob Taylor,** I, answered my letter congratulating him on being 80 years of age and sent along a contribution for the "Kitty." I worked on the Beacon Hill tunnel and Boston subways with Bob for several years before coming to Whitinsville. After he left Boston, he went to New York and Philadelphia, where he was resident engineer on several subway and tunnel projects. He spent eight years in handling defense actions in law suits against the New York City Transit Authority. Following this, he was managing engineer for a contractor and, at present, is associated with a consulting engineer in New York, living in the Bronx. Bo married, had a son and daughter and now has a grandson and granddaughter. His hobbies are working, walking, and reading.

As noted in the April Review, **Carl Brewer,** II, passed away March 28, 1963. I wrote to the family and had a fine letter from his son Richard. Before coming to Tech, Carl was graduated from Yale in 1905 and, after leaving Tech, took additional studies at Sheffield Scientific School of Yale and then, in 1908, went to Ishpeming, Mich., on the Marquette iron range. Until 1931, he was employed at the Ashland Mines, the Menominee iron range, and the Misabi iron range. In 1931, Carl was appointed chief mining engineer for Cleveland Cliffs, a position he held until his retirement in 1955, making his home in Ishpeming. In 1959 he moved to Duluth to live with his son Richard. Carl was a member of Grace Episcopal Church, where he started and directed the Episcopal Trust Fund. Bishop Page paid the following tribute to our classmate: "May I say frankly that very few dioceses in the scope of my knowledge ever had as faithful a servant as Carl. No detail seemed too unimportant for his careful attention. No words of mine can ever explain to the diocese the painstaking labors he expended. He gave unstintingly of his time and of himself. Nothing that touched the larger life of the diocese escaped his notice and support. Northern Michigan regrets his going, but thanks God for the privilege of having him with us all this time."

I wrote **Tom Roby,** I, on his 80th birthday. He had become a great-great-grandfather last September and says: "I now consider myself at 80—starting my second cycle of life." Three weeks after starting his retirement in 1954, he had a stroke from which he never fully recovered, and this forced him to change his way of living. Mrs. Roby passed away in December, 1962. He regrets that he never "felt equal" to attending the class reunions. I found out that Tom and myself have a common ground as philatelists and have much on which to compare notes. . . . **Ernest Miner,** I, has a new address: Linger Longer Retirement Home, Route 2, Box 196, Sebring, Fla., 33870. Ernest has a small home at Punta Gorda but has not been well and decided to spend the remainder of his days with friends at the above address. He worked for many years in the Central Drafting Office of the Brooklyn Navy Yard, retiring on pension in June, 1937 and living in Florida ever since. . . . My letter to **Frederic Menner,** XIII, was replied to by a Miss Warner who told me that Fred has been very ill since October, 1963, and is at the Santa Barbara Convalescent Hospital, unable to read or to communicate with anyone.

Herbert A. Sullwold, IV, writes that he was unfortunate enough to break his leg near the hip about a year ago. He was invalided for eight months but walks now with only a slight limp. Herb is in his 81st year. Good luck to you, Herb. It was good to hear from you.

Franklin O. Adams, IV, is an architect in Tampa, Fla. He retired about four years ago. I have sent him a list of all '07 men now living in that area. He reports that he is "in excellent health except for a slight touch of arthritis which doesn't bother me much." Any '07 man visiting Tampa should try to visit Frank. . . . Perhaps some of the Course III mining engineers will recall **Roland H. Willcomb.** He did his thesis with **Albert Wiggin.** He has now retired and is living in Silverdale, Wash. He has a very comfortable home on the shores of the Hood Canal in the Puget Sound area. He writes: "We have a beautiful place looking across the water to the Olympic Mountains west of us. I still keep busy with my garden and buck saw. We do some vacationing by car around the Western states and in Canada but find our place here too comfortable to leave for long." . . . **Ed Lee,** I, sent me a clipping from the Fort Myers New Press which was a news item about Julian Hudson, the new chairman of the County Commissioners. Julian is a son of **Ralph Hudson.** Ralph lives with another son, Gerald, who works with Ball, Horton and Associates, Consulting Engineers. I quote from the clipping: "Hudson's father is the author of the standard engineering manual used at West Point and Annapolis, the service academices. The work was pirated by Russia and Yugoslavia for use in their engineering schools and has been printed in several other languages. The most recent edition is in Portuguese. Julian Hudson recalls that his younger brother, Perry, seeing other fathers go off to work every day, while his dad went to M.I.T., asked: "When is Daddy going to get out of school?" The elder Hudson got out of M.I.T. after teaching there 53 years." Ed Lee had business with Commissioner Hudson and inquired for Ralph. He learned that he has not been well lately. Ed will try to visit with Ralph in the near future.

Willis Waldo, I, is very active in business at West Palm Beach, Fla., even though he is one of the older members of '07 according to the calendar. He is very much interested in the development of trailer parks. He writes: "At present, I am doing the designing and engineering on two parks, each of a different kind. One is an eight-acre rental park, in which about half the area is in two small lakes which add much to the attractiveness of the design. The other is a 20-acre "Mobile Homes Community Park" in which the lots are to be sold. Both are to have private utility systems, excellent water from their own wells, sanitation, power, phones, etc. The streets are to be asphalt paved, with due consideration for drainage, parking, and other features." He reports he has been running a transit for several weeks and laying out the various features of the park although a year over the four score mark. A recent picture shows Willis to be a very young appearing octogenarian. . . . **Frank MacGregor,** VIII, is one of my most faithful correspondents. From him I get news for these notes and sug-

gestions for class activities. In his recent letter, he raises the question as to whether or not we would get better attendance at our 1965 Reunion if it were held other than on Cape Cod. Something for us to think about.

The names of three '07 men appeared in the February Review as being octogenarians. **Frank Hamilton,** VI, University Club, Milwaukee, Wis.; **Paul Frederick,** VI, 508 Osborne Lane, Sewickley, Pa.; and **William J. Walker,** I, Hotel Dimeling, Clearfield, Pa. I sent each a congratulatory letter from the class. They are all carried on our non-associate list. If you personally know any of these three classmates, why not write to them and also tell your secretary what you know about them?—**Philip B. Walker,** Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould,** Assistant Secretary, 409 Highland Street, Newtonville, Mass.

'08

The second dinner-meeting of the 1963-1964 season will be held at the M.I.T. Faculty Club, 50 Memorial Drive, on Wednesday May 13, 1964, at 6 P.M. Plan to come and see the old gang. Ladies are invited. In June the class will have been out of school for 56 years. What if anything, should we do to celebrate? It will be decided at this meeting. . . . How about the Alumni Fund? There is still time to make your gift. If we are to reach our goal, everybody must help. Many of those who have already given have doubled their gift of previous years. Please help—**H. Leston Carter,** Secretary, 14 Roslyn Road, Waban 68, Mass.; **Joseph W. Wattles,** Treasurer, 26 Bullard Road, Weston 93, Mass.

'09

We have received no personal news items from members of the class to include in these notes this month. We can only emphasize the fact that the Reunion Committee is now preparing the plans and pertinent information which will probably have been received by the members of the class before this number of The Review reachs them. As has already been stated, we shall meet Sunday morning, June 14, at the New Ocean House, Swampscott, Mass., and visit together during the morning in a room that will be reserved for us. There will be a class luncheon at noon and our class dinner in the evening, probably with a speaker. Meeting rooms will be reserved for all day Sunday and individual room reservations will be available in the early afternoon. The hotel will not have rooms available for Saturday night but for those who need such overnight accommodations, two new motels in the immediate neighborhood will be available. On Monday morning we will all leave for Alumni Day at the Institute to complete the reunion. Be sure to reserve the two dates, June 14 and 15, and plan to come and bring the family—**Chester L. Dawes,** Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass.; Assistant Secretaries: **George E. Wallis,** Wenham, Mass.; **Francis M. Loud,** 351 Commercial Street, Weymouth 88, Mass.

'10

Walter T. Spalding of Honolulu, Hawaii, writes: "I have kept your good letter to all classmates of 1910 on top of my desk ever since it came last October, to make sure to answer it. Even with little to report I think the least we can do to thank you for your many years of service to the class, is to write you and through you to all 'Mittens.' My deferred response is due to a busy period in writing, designing and printing and, most of all, to compiling the addresses of over 5,000 teachers and schools for mailing out the brochure on the Spalding method of teaching the basic elements of writing, spelling and reading English. You see, I decided in 1962 that it was far more important to help my good wife in her educational work than to design more buildings in Hawaii. So I closed my architectural office downtown and moved to the cooler and pleasanter quarters of our hilltop home overlooking the city. You have seen both places. Each summer we travel across the U.S. wherever teachers have organized classes for Romalda to teach her method in ten-day courses. We also visit her mother and sister in Illinois and our 35-year-old son (WTS, Jr.) and his delightful family, four in all, in Cleveland. He is working with us, part time. This summer we shall do likewise and perhaps see you in Boston. In 1962 we had a class of about 100 in Peterborough, N.H., and enjoyed very much seeing **Dudley Clapp** and Mrs. Clapp, often. He was a wonderful fellow and his death I still feel as a great personal loss."

Carl H. Lovejoy, Boynton Beach, Fla., writes: "You sure did stir up a bunch of letters with your request for news. The list of survivors is enlightening. I still have a copy of the Senior Portfolio (and that is all, after my many moves). It would appear that we are all at or past the three-quarter century mark. I do plan to go north this summer in June and as Alumni Day seems to be changed to the 15th, I hope to be there. It is our 50th anniversary, and we expect to get together near Pittsfield with our older son's family, three grandchildren and our younger son from Cleveland will come on with his family—five grandchildren. We find Florida living very enjoyable and healthy. Have not had a common cold in the six years we have been here. Hoping to see you in June." . . . **Chester W. Wilson,** West Newton, Mass. writes: "I have never written you before, but I have seen you at various functions and after your impassioned plea I thought I would drop you a line of a few recent ventures of mine. I would not say I had done anything 'worthwhile' when compared to some of my classmates, nor measured as contributions to business or science. However, what I have done, especially in late years, instead of retiring has kept me active and in reasonably good shape. We have a summer place at Falmouth and our son-in-law, is a professor and has just been made a department head at U.N.H. in Durham, N.H. We take off most of the time South to the Cape or North to Durham. I am not retired and don't look forward to it as I can't stand being inactive. I have a modest selling position which does use certain amounts of my training and there is none of this 'compulsory retirement.' So not envisioning any retirement leisure in my normal healthy span when I am able to I am trying to work in some highly concentrated vacations, which cover a lot of ground quickly getting there but leave you time to do a little more than if you went by boat for instance. A couple of years ago my son-in-law was invited to attend an endocrinological symposium in Tokyo. On the spur of the moment my wife and I agreed to go with him. Well, it was worthwhile to us as we had never been out of the U.S. except to Canada. We left at 9:30 at night from Idlewild in pitch black darkness in early June and flew by jet to Alaska. It was quite a thrill to see the run rise in the west and land in daylight! The jet speed was so fast we overtook the sun and got that illusion! Then we hired a car and went sightseeing north and south of Anchorage. Our next stop was Tokyo, Japan. My wife and I went sightseeing for five days while the Professor attended his meetings in Oiso. Then we went down and picked him up and 'did' Kamakura, Enoskima, Lake Hakone, Nicco and many other places. Finally it came time to come home. But before we did we went to the top of Tokyo Tower which was only finished in 1960 and is 50 feet higher than the famous Eiffel Tower in Paris. The view was superb. On the way home we stopped over in Honolulu and toured that island. We didn't know pineapple juice till we had it there on the spot! The next stop was Los Angeles and thence to Denver, where we hired a car again and toured Rocky Mountain National Park. Thence, on to Chicago and home. A most worthwhile adventure with many beautiful colored slides to refresh our memories.

"Last year we did it a different way (meaning this last summer) by taking the Professor's Ford bus and our family of two, his family of five, camping gear of tents, stoves, lantern and so on and traveling through our midwest. Our first overnight camp was in Mountain View Park near Rocky Mountain National Park. We stopped for a swim in Salt Lake, Utah (once for the novelty is adequate!) and drove up to the 12,000-feet peaks of some of the most superb scenery. Then we camped in Bryce Canyon and 'did' that before moving on to our main objective which was Zion National Park. We camped four days in Zion and took the trails, swam in the pool, and investigated the by-paths to our hearts' content. We had hurriedly driven through on our way to California several years before and vowed we would come back and 'sit down' some day and enjoy Zion! This was the year we did it. Next we camped on the North Rim of the Grand

Canyon. We had seen the South Rim but we had been told it was quite different on the North Rim and they were right. Although it was the end of June and hot in the desert it was 30 degrees F. the morning before, the Ranger said. I think most people, as we did, imagine a deep declivity as being the extent of a canyon but the North Rim of the Grand Canyon where we camped was at a 9,000-feet elevation. From there we went over to Cedar Breaks (very much like Bryce Canyon) and up on Brian's Head—11,381 feet of driveable miles, the last few not so comfortable. This mountain 'blew it's top' in recent years and acres and acres of lava rock lie around for miles, not far even from Navajo Lake. Speaking of Navajo Lake, on the way home we went through Navajo Reservation and for a New Englander it was a marvel how they even survived in the barren, unfriendly looking land. At this point my leave began to get too short so at Alberquerque, N.M., we left early of a Thursday morning, 2,500 miles from my home and were driving up to our door at 8:00 P.M. on Sunday night. It was during that terrible hot weather you had here and Sunday was the first time I perspired! Out west it would be well over 100 degrees many times but the air was so dry it lapped up the moisture as soon as it formed. The whole trip took 16 days and covered 6,800 miles and was a splendid experience for us and a good education for my daughter's three boys 8, 11 and 13. Oh, and also if any of you object to the ever-increasing motel rates, remember you can sleep seven in the National Parks on a two-week permit, allowing you to go and come as you please and costing the enormous sum of $1.00 if you bring your own camping gear and love the wide open spaces!

"On the business side I have worked for the same man for the last 25 years in three companies at different times selling methods and services; and much of the work involves designing, planning, a knowledge of special machines, accounting and other office procedures as well as factory systems. All of this will use my training in one spot or another in the sales and servicing. The work is interesting and as I get older does not impose an unusual tax on my physical wellbeing. There is a matter in connection with clubs that I could put in here. The United States Power Squadrons is an organization for the teaching and promoting of safe boating, and we work with the military forces in time of stress, teach navigation extensively free, and other allied courses like engine maintenance, weather, etc. I joined this in the early days of the last war, about 1941, have a degree of navigator, taught the U.S.C.G. Auxiliary in war time as a training officer and have held numerous positions in the U.S.P.S. including becoming the district commander for this area in 1956 and 1957. I have also done teaching, for which we do not get paid, as all work is by the members on a voluntary basis. The squadrons, as the local groups are called, are run without a cent of salary being paid to anyone. We have some 60,000 members all over the country in some 300 squadrons. We have a separate but allied club of the 'elite', so called, which is made up of U.S.P.S. navigators only and called The Navigator Club. Membership in U.S.P.S. is by invitation only but we train thousands of the public every year on safe boating and issue a certificate of completion at the end of the course. Members, therefore, are, as a whole, of teaching or administrative quality and willing to give of themselves to the goal of safety on the water. The present trend to scuba diving, outboards (often by irresponsible parties) and water skiing (ditto irresponsibles) is requiring the extension of our activities into this field more and more with the hope we can at least cut down the casualties! This is my feeble attempt to answer your 'wail' for succor and assistance, and if I have been able in my small way to help bail you out, I shall feel repaid for the effort."

Mrs. William McNair Schofield, Orlando, Florida writes: "A letter has been forwarded to me from Akron, Ohio with inquiries about members of the class of M.I.T. 1910. I was married to your classmate **William McNair Schofield** in 1914 in West Virginia. I met him while he was working in the bituminous coal fields of West Virginia. He got his degree at M.I.T. as a mining engineer and followed that profession. In 1917 (World War I) he enlisted in the American Army, won a commission in the Second Officers' Training Camp at Benjamin Harrison. He was assigned to the 342nd Field Artillery, 89th Division. He was kept in this country as an instructor for nine months. Then he was sent directly to France from 'The School of Fire' at Fort Sill, Okla. He served with the front line forces during the last months of the war. After the Armistice he served for eight months in the Army of Occupation in Germany. He also acted as interpreter for his regiment in French and German, both of which languages he spoke quite well. After the war was over he returned to Boston, where he also worked as an engineer with a Bakelite concern, headed by M.I.T. men. Finally he moved to Akron, Ohio, to join his brother Lane Schofield (M.I.T. Class of '05, I believe) in the mercantile business. He died in July, 1958, from an internal hemorrhage from the effects of an operation. He is buried with his family in the Newton Cemetery. This must sound quite garbled to you, but I feel you can sort it out and probably use some excerpts from it. I forgot to say that we had one son, William McNair Schofield, 2d. He died in early childhood. Another thing—a boast pure and simple—of the 30,000 graduates of Officers' Training Second Camp at Benjamin Harrison, all college graduates, Bill's grades were third highest—But what would you expect from a Tech man?"—**Herbert S. Cleverdon,** Secretary, 120 Tremont Street, Boston 8, Mass.

'11

A letter from **Allston T. Cushing,** formerly head of a construction engineering firm in Kansas City, Mo., says that he is retired so far as his business activity is concerned. His main interest now is the American War Dads of which, after some years as a chapter president, he is now national executive secretary. He is also secretary of the Foundation Council in Kansas City and treasurer of the Missouri State Association. No wonder Allston says his War Dad work keeps him quite busy. . . . The February notes this year included a report from the **O. W. Stewarts** of a meeting in North Carolina with **Guy True.** We now learn that Guy died in Raleigh, N.C., on February 15. He was born August 10, 1888, in Boston and prepared at Mechanics Arts High. Guy never retired. For the past 15 years he has been a structural engineer for William C. Olsen and Associates. Surviving are one daughter, Mrs. Ruth Hawkins of Rutland, Vt., and two brothers, William and Clarence of Miami, Fla. . . . **Wesley T. Jones,** who came to our class in 1910 with a degree from Virginia Polytech, died in Daytona Beach, Fla., December 23, 1963, not long after moving there from Richmond, Va. He joined the engineer of Tests Department of the New Haven Railroad in 1912 and was with the New Haven and B&M for many years. In 1948 he was assistant to the general manager of Barco Manufacturing Company in Chicago. He maintained his connection with that company as manager of railroad sales and sales representative until shortly before his death.

Two other deaths are reported by the Alumni Office. **Abraham Shohan** was born in Russia in 1889 and prepared at Boston English High. He has not been an active alumnus so the only information we have about him is that for the last 15 years, at least, he has lived in Rhinebeck, N.Y. . . . Also reported was the death of **Robert S. Thurston,** who joined us in 1911, with a B.S. degree, for a year of special study. He has been associated for many years with the Honolulu Advertiser in Hawaii. . . . There are two changes of address: **Burgess Darrow,** 50 Orchard Road, Akron, Ohio 44313; and **Morell Mackenzie,** 12 Faber Avenue, Providence, R.I. 02906.—**John A. Herlihy,** Treasurer and Acting Secretary, 588 Riverside Avenue, Medford, Mass. 02155.

'12

Have just learned of the death of **Edward C. Mayers** at his home in St. Petersburg, Fla., where he has lived since retirement. I frequently see **W. J. Murray** and his wife at the Old South Church on Sunday. He told me last week that **Clarence K. Reiman** was suffering from Parkinson's disease and was now at the Reservoir Nursing Home, 1841 Trapelo Road, Waltham, Mass. He would be delighted to hear from any of his old friends and I hope that those who knew him would be good enough to write. . . . **Harold G. Manning,** Waterbury, patent attorney for many years, has become associated with the firm of McCormick, Paulding & Huber of Hartford. Harold will continue a branch office at his present location, 24 Central Avenue, Water-

bury. Harold is a member of the bar of the Federal District Court of Connecticut, bar of New York State, the District of Columbia and U.S. Supreme Court. He also belongs to several national law and patent law associations. Harold is a young man apparently getting ahead. . . . **Albert Harkness**, IV, of Providence, R.I., has written that his firm Albert Harkness and Peter Geddes has won the competition for a $6-million group of buildings and an education center in Providence. His son, a partner of the Architects Collaborative in Cambridge, Mass., was associated with him on this work. The first award carries a prize of $25,000.—**Frederick J. Shepard, Jr.,** Secretary, 31 Chestnut Street, Boston 8, Mass.; **John Noyes,** Assistant Secretary, 3326 Shorecrest Drive, Dallas 36, Texas.

'14

When your secretary was associated with his own company, he was always insistent that everyone should take his vacation; one reason for this is that it gives an opportunity for new viewpoints to be presented. The last issue, written so well by **Ray Dinsmore,** as well as those written by **Herman** occasionally, bear out this idea. Not only did Ray write the April Review notes, but on my return to Cambridge, he came out from Akron to check that everything is in order for the 50th Reunion! . . . **T. P. Hsi** has just returned from the Far East, including Taiwan, Manila and Hong Kong; he and his wife expect to be at our reunion in June. . . . One whom we have not heard from for a long time is **Alfred Kitchen.** He was a student and laboratory assistant in electrical engineering. He now lives near Philadelphia and writes that, unfortunately, he will not be able to attend the reunion; but he expresses his good will. . . . **H. S. Busby,** formerly of Springfield, Mass., writes also that he finds he cannot attend the reunion as he has just moved to Brevard, N.C. . . . Professor **Leicester F. Hamilton** has just published the 12th edition (with Stephen Simpson, '16) of "Quantitative Chemical Analysis." From the published announcement of the new edition we gather that it must be something of a bible in its field. This edition is a completely revised one and includes a great deal of new material. "Ham" has been in the Chemistry Department at the Institute since graduation.

New addresses were received for **Robert H. Tuttle,** 6642 Humbolt Avenue, South Minneapolis, Minn.; **Percy F. Benedict,** 38 Prospect Street, Tilton, N.H.; **Ralph D. Bates,** 1336 Magnolia Avenue, Oakdale, Calif.; **Paul R. Smith,** 41034 Dangan Hills, Staten Island, N.Y.; **Albert N. Henricksen,** 195 Revere Road, Roslyn Heights, N.Y. . . . When **Randolph H. Mayer** died on March 1, 1961, we had no details to report, in fact mail had been returned from his widow. Mrs. Mayer found some clippings recently which she has kindly forwarded. Randolph had been an operator and co-owner of the Shreve Island Plantation of Shreveport, La. He transferred to the Institute from the Louisiana State University and here studied electrical engineering. However, he spent his entire business life raising cattle and cotton in addition to developing residential areas. Besides his widow, his is survived by five sons, three of whom became engineers, and two, lawyers. He was loyal to the Institute and his widow keeps up this association.

Only a few days after your secretary had dinner with him to discuss the 50th Reunion, we were shocked to hear that **Donald R. DesGranges** died suddenly on February 21. Don had moved, only a few months before, to Marshfield, Mass., and told me that was why he could not take part in planning the forthcoming reunion. He came from New York City, prepared at the University High School of Chicago, Ill., and transferred from Columbia University to the Institute. Here he was vice-president of the Architectural Society and a member of Delta Tau Delta. During World War I he was a first lieutenant in the Railroad Engineers, serving in the A.E.F. from July, 1917 to January, 1919. Don is survived by his widow and a daughter. . . . Another architect to die recently was **Hamilton Harlow** on January 21. He came from Cambridge, Mass., and prepared at the Rindge Technical High School as well as the Cambridge Latin School. Harlow spent his life designing apartments and building them, and later in owning and managing numerous properties. In World War I, he was a sergeant of infantry serving with the 151 Depot Brigade. His wife and a son survive him.

Howard S. Willis died on December 6, 1963. Willis was born in Lawrence, Mass., graduated from Lawrence High School, attended the Worcester Polytechnic and transferred to M.I.T. Willis returned to Lawrence and spent most of his life with H. P. Hood and Sons, Lawrence Branch. His home, however, for the past 30 years, was at Salem, N.H. He was interested in public affairs and served as New Hampshire legislator, town selectman, school district moderator, school committeeman, municipal budget committeeman, and numerous other posts. He is survived by two daughters and a son.—**H. B. Richmond,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.; **Charles P. Fiske,** President, Cold Spring Farm, Bath, Maine; **Herman A. Affel,** Assistant Secretary and Class Agent, R.F.D. 2, Oakland, Maine; **Ray P. Dinsmore,** Reunion Chairman, 9 Overwood Road, Akron 13, Ohio.

'15

Our class has suffered a hard and sad blow in the passing of **Frank Scully,** who died suddenly at home in Belmont, Mass., on February 21. We have lost a fine old friend and an outstandingly active leader in class and alumni affairs. Born in Cambridge, Mass., Frank graduated from Rindge Tech and St. John's Preparatory School and took Course I with us. A member of Beta Theta Pi and one of the founders of the M.I.T. Chapter, he was very active in undergraduate activities: a member of Osiris, Cosmopolitan Club, Civil Engineering Society, and Institute Committee. He was class president, junior year; vice-president, sophomore year; chairman, Junior Prom Committee; vice-president, Institute Committee, junior year; on the class football team and captain, sophomore year; class basketball team, both player and manager, freshman and sophomore years; class baseball club, freshman year; M.I.T. A.A.; Class Day Committee, senior year; and class marshall at graduation. In our junior and senior years, Frank wrote music for Tech Show and whenever contemporaries of that time gather, his old "Meet me at Hyler's" is still a top tune. With **Henry Sheils** he did a thesis on "An Investigation of the Strength of Cinder Concrete."

In Alumni work Frank was a regular contributor and supporter and worked hard as a solicitor on the recent Second Century Fund. Following graduation, he operated the family businesses in Cambridge, Scully Construction Company, and the Scully Sand and Gravel Company. He was the organizer and president of the Scully Signal Company, manufacturers of the "Ventalarm," a protective whistle used in filling fuel, oil and liquid tanks. Many will recall those tantalizing joke whistles for an auto's exhaust pipe which Frank gave us at reunions and class dinners. He was an ardent worker for Proportional Representation—the so called "E" plan—now used in Cambridge elections. With his interest and sincerity in civic and community affairs, Frank had been a wartime member of the Cambridge City Council and in 1946 served as chairman of the Water Board. He was a former trustee of the Cambridge City Hospital. He was a member of the Clover Club, the M.I.T. Faculty Club, the Algonquin Club, the Newcomen Society of North America, the National Oil Fuel Institute and the Eastern Yacht Club at Marblehead, Mass. In 1959 he received the American Success Story Award from the Free Enterprise Awards Association, Inc., symbolizing the opportunities for success under our American free enterprise system. With his gay piano playing, Frank always led the singing and music at our class dinners and reunions. Until December, 1926, Frank served as class secretary with **Howard Thomas** and **Bill Spencer.**

He leaves his widow Mary (McGowan); three sons, Francis P., Jr., of Marblehead, Robert G. of New York, and Peter L. of Belmont; a daughter, Mrs. Robert Norton of London; a brother, James N. Scully of Cambridge; and two sisters, the Misses Genevieve and Florence P. Scully, both of Cambridge. A large delegation from our class, some with their families, attended the wake at his house and the Solemn High Mass of Requiem in St. Camillus Church, Arlington. Burial was in Mt. Auburn Cemetery, Cambridge. Anything we say here will fall immeasurably short of possibly or properly expressing our fond regards for Frank and our deep, sympathetic feelings for his family. But we can always remember him as a true, loyal, devoted friend and classmate. The donations from our class, a benediction incenser set and a priest's vestments, will remain in his

parish as a memorial to Frank. May his soul rest in Eternal Peace.—**Azel W. Mack,** Secretary, 100 Memorial Drive, Cambridge, Mass.

'16

Again, the opening message from our President, **Ralph Fletcher,** who reminds us that things are all set for the 48th Reunion. Says he: "Remember the dates—June 12, 13, 14; and the place—Chatham Bars Inn, Chatham, Mass., out on the Cape. And if you need any kind of help on transportation, just let me know." . . . A card from **Phil Baker,** from Cartagenia, Colombia, has jiggly writing, explained as follows: "This table moves up here high on this 'Franconia'—temperature 85 degrees, clear and sunny, halfway across the Caribbean to Cartagenia." . . . We forgot last month to mention a card received from Ralph Fletcher in Davos, Switzerland, showing a gang of six skiers (one of them could have been Ralph) speeding down the side of a long hill in the midst of six little snow-dust-storms and lengthening shadows. How he does it, nobody knows! . . . The **Peb Stones** left late in April on a European trip—a kindergarten tour, Peb calls it, with visits to Rome, Germany, Switzerland, Paris, and London. But, says he, return will be in time for the reunion June 12-14. He reports that at the March class luncheon in New York, only he and **Joe Barker** were present, outnumbered seven to two by the Dix Proctor '17ers. These class luncheons are held on the Thursday following the first Monday of each month, at the Chemists' Club, 52 East 41st Street, near the Grand Central.

Near the end of February, the **Bob Wilsons** reported good going on their automobile trip to Florida, right after Bob's retirement as an A.E.C. commissioner. From Tallahassee they reported having already talked by telephone with the **Emory Kemps** in Sarasota, the **Stew Rowletts** in Clearwater, the **Frank Rosses** in Naples; also Bob had a little visit with the **Jap Carrs** in Palm Beach. After returning home to Washington for a while in March, they plan to take another and longer trip out West to stay for awhile in Phoenix. We can imagine what a relief it must be for Bob to have no one on his t(r)ail for such a nice long period of time. . . . Early in February the **Kem Deans** returned to Houston from an interesting and enjoyable trip to Mexico City, Cuernavaca, Morelia and some of the other smaller but quaint towns. He writes: "Sometimes it amazes one to see how some other people live and exist, but I think in many cases and places that is the way they want it. There are some places on the west coast where we have not been and would like to see. The fishing all along the coast is really fabulous. Maybe some day we may drive down from Tucson to Mazatlan and get some first-hand experiences." Kem says they are planning on a trip to Europe in May and hence can't be on hand for the reunion. . . . **Willard Brown** now reports with what-we-would-call glee that his 50th at V.M.I. comes a week earlier than our 48th at Chatham, on the Cape, so he now expects to make our get-together on June 12, 13, and 14. He adds: "Not much news, seem to be busy most of the time."

Charlie Lawrance reports a delightful surprise call in January "from **Dan Comiskey** and his lovely wife—most cordial and friendly. We talked of reunions past and future; he hopes to be at the 48th in June and the 50th." Dan sent along through Charlie to **Jim Evans** and your secretary a pithy column of grinny-smiles for whom-we-refuse-to-call "old folks." Charlie says he wishes 'they' would use up "the cold storms and snow clouds in Kansas, in Indiana, and in Pennsylvania and not send New England the unused and unwanted fragments to torment us, with our 'changeable 15-minute weather'." . . . **Art Shuey** reports: "We have just purchased, First Class, three-month Eurailpasses covering all wanted rail travel in the 13 European countries, instead of driving. Will give you a report later." They are headed for the continent by ship. . . . We don't know how he does it, but that's how we understand it—upwards of 40 hours a week on homework! Who is it and What? It's **Howard Claussen,** in Cotuit who continues extensive studies in celestial navigation under the direction of the U.S. Power Squadron. In years past he has finished off all of their 'professional' courses courses through junior navigator, with only the 'N' course to be completed. And do you know what? When finished "except for his age and a bit of practical work at sea" he should be qualified to take a ship around the world. He says he was early challenged to acquire "the coveted title of Navigator, entitling me (and/or my cruiser) to sport three bronze stars." Pretty good, say we! If interested in this level of activity, write Howard, at Cotuit, Mass.

Marcel Gillis' reply to "what you've been doing" goes like this: "I retired as Colonel, U.S. Army (after 29 years service) in 1946. Bought in the village of Waveland (Miss.) on the Gulf of Mexico, 57 miles out of New Orleans. My wife (nee Marcie Caffery) plays, plants, and parties; so do I with side-lines of fishing, duck and dove hunting. As to 'where you've been or are going': after almost 30 years of professional 'visiting' in many states and countries, we are content to stay put, but we do go to Key West for January and February almost every year." And as to "who've you seen," Marcel says: "Alas, not one old patron of Solomon Levi have I beheld these 48 long years! Any old 'Stute (viva Boylston Street!) or new Cambridge vacationers heading south, please stop—plenty room, always, and Be Very Welcome!" Then he has this after-thought: "Wonder whatever became of the pretty girl (Course II, can you imagine it) we male students used to compete to 'flat' for in 'Forging and Foundry'! Sledge was a bit heavy for her; she kept the 'neatest' fire in the class in several ways!" And from sources, including the 1917 Technique, plus other '16er memories, we conclude that it was **Sibyl Walker,** although her course was III, Mining Engineering.

Maynard Guss, writing from Santa Barbara and speaking of the 1963 Reunion picture comments: ". . . that very interesting photo of the last reunion, in which the men look at least as old as I do, and the ladies younger, and with very pretty legs!" Maynard is on his 12th year as treasurer of his church, is a charter member of the Retired Men's Club of Santa Barbara, and instead of selling his house and "moving into an apartment as many of my fellow retirees in their 70's do, I bought an acre, sold house and built a bigger one and now do gardening the year around." Way back, the Gusses made seven round trips, Boston to Shanghai, when he worked out there and got travel out of his system. Now, in the last five years, the only major travel has been to Bridgton, Maine, for a reunion of the Guss family. . . . The February issue of 'The Percolator,' Chemists' Club magazine had a good-looking picture of our **Rudi Gruber.** Why? A little article tells why: "World traveler and scientist friend of chemical education, Dr. Rudolf Gruber (Emeritus member, 1916) a member of the Advisory Board of the Council for Chemical Education, has just been most active in researching activities of the growing number of science museums in this country and abroad. Dr. Gruber reports that he has sent dozens of sample copies of 'Science Report' abroad to scientific colleagues as he enlists more friends to support plans for the development of an inspiring Museum of Science and Engineering for New York." We also have an interesting picture of "Goethe House" of which Rudi is a member, located at 1014 Fifth Avenue near 82nd Street in New York, and which serves as a cultural link between the U.S. and Germany.

We are glad to hear from **Raymond Blakney** who has just gone into retirement after a most distinguished career. (For more than we can tell, see "Who's Who.") He writes: "Since you ask so well, here is a high (or low) light on Blakney fortunes. We are now three months into retirement, here in Pilgrim Place, a community of people who have lived all over the world and many of whom we have known in other countries or other places. This is a pleasant hive of activities, where the sun usually shines." The new Address: 660 Alden Road, Claremont, Calif. As many will recall, he was last the minister of Prospect Congregational Church in Seattle; before that, President of Orlinda Childs Pierce College in Athens; and before that, President of Olivet College in Olivet, Mich. He notes: "Our chief personal pride is in the next two generations: three children, 10 grandchildren. Pride leads us to report great satisfaction in observing that the next generation is a definite improvement on its immediate forebears. Son Robert is professor of physics at the University of Rochester (three children). Daughter Jean is the wife of a noted heart surgeon in the University Hospital, Cleveland (three children). Son Charles is a missionary, at present doing pioneer work in Salisbury, Southern Rhodesia

(four children). Each generation, as it comes, should show improvement, shouldn't it? Kind regards to you and all 1916."

Irv McDaniel had turned over to us for 1916 Reunion purposes his school-days scrap book and what he refers to as his Stable of Women—actresses, all, in the good Tech Shows he wrote way back when! Some of the issues of The Tech in his scrap book will surely bring memories. He and Kay plan to drive East in May and June, and we look forward to hearing at first-hand, accounts of the strange, the unbelievable and the oh-No! things that were not included in his letters from all over. Many of Irv's letters had wonderful descriptions of places. Here's one on Cadiz: "Then we had a day in Cadiz and thanks to Courtney Jones, the ship's agent, Senor Huart, met us and loaned us his car and chauffeur. The museum in the Cathedral is a 'Must'. They have an outstanding Murillo and an alleged Michelangelo (painting), but it is world famous for its jewels. Nowhere in Europe or Istanbul have we seen anything comparable. Gold and silver, inlaid with thousands of enormous emeralds, rubies, diamonds, and pearls the size of pullet eggs. They also have a thorn from Christ's Crown of Thorns and a finger bone of St. Peter's. Then we had lunch at the Huarts, and they are a charming couple. Their house is also a museum with magnificent paintings, ceramics, but what I liked best of all were their ancient, 3,000-year-old Phoenician relics—all found in Cadiz. These consist of solid gold necklace, bracelet and rings. They claim that Cadiz is the oldest city in Europe."

The Irv McDaniel and Sylvia **Young** letters that were circulated to a moderate degree have now been pretty well returned. Should any '16er wish to see one or more of these fascinating letters just drop your secretary a line. What to see and where to go—these letters are quality accounts! Some, like **Don Webster,** ask to keep a copy longer, saying: "I would like to keep it for a day or so until Eleanor can copy part of it for me. I want to write Mac direct and needle him a bit about politics." We are glad to report that Eleanor Webster is making good progress, but the trip to Florida had to be called off . . . The **Harold Millses** were scheduled to take off in their Olds on their nth trip to California late in March, to visit two daughters and families in the San Francisco area. We are not betting that they will not stop in southeast Utah to jeep-ride, explore, and take pictures both going and coming. . . . With after 9:00 P.M. low telephone rates for long distance, your secretary early in March talked from Albuquerque with Irv McDaniel in Newport Beach, Calif., who, with Kay, is coming to the reunion in June; with someone in Palm Springs, Calif., who answered the phone and said **Francis Stern** (and Gladys too) had just gone to dinner or somewhere; and to **Stewart Keith** in Denver.

We were glad to know that **Ed Williams** is really getting around again as evidenced by a letter in February from Daytona Beach, Fla. Although he had not been able to get off Cape Cod for more than two years, he says: "We decided last fall to try our old favorite trip up over the Mohawk Trail and then into Vermont, New Hampshire, and Maine ending with a few days at Severance Lodge at Center Lovell, Maine. I came through the trip in flying colors, so we decided to try for Florida again, and although we drove down at covered-wagon speed we are now settled in a housekeeping cottage overlooking the beach here, and often drive over it for more than 20 miles. We plan to be here until May 1." Ed says: "While the Florida weather is nothing to rave about, all we need do to appreciate it is to read what our Cape Cod neighbors are getting there at home." . . . Early in March a card from **Cy Guething** date-lined Delray Beach, Fla., indicated that they were on their way home, from Harbour Island. Earlier we had a letter from Cy that read like this: **"Harold Dodge** has asked me for an account of fishing in the waters adjacent to Harbour Island and Eleuthera, Bahamas, where Gypsy and I spend our winters. We procure the services of the best guide on the island for the type of fishing we wish on a given day. He first gets some conch for bait by lashing a bail or fork on a grains (a fish spear which consists of a pole with two barbed prongs on the end) with sisal (which is used in making rope). He puts the hook under the conch which rest on the bottom and brings them up to the boat. He then breaks them out of the shell and cuts them up for bait. Another form of bait for the larger fish is chub; these are caught in shallow water with a type of casting net that is used throughout the tropics. We chum with the cut-up chubs and also put them on the hooks. In a few hours' time we catch about 30 fish on the average. Any of the conch that the fish won't eat as bait we use for making a delicious Bahamian conch chowder." . . . **Charlie Reed** writes from Bethesda, Md., that son Bill was married in mid-February and was off to the Virgin Islands on his honeymoon. Son Carr has graduated from North Texas State University and is with the Preston State Bank in Dallas. Although most of us are doing half-time or less, Charlie himself is still working full time with the McLaughlin Research Corporation! He adds: "My other two sons, Charles and Bob, are in the regular army, a lieutenant colonel in the Engineers and a major in the Infantry." . . . **Harry Lavine,** whose name still appears on the Equitable Life letterhead as "life underwriter," writes from Boston that his physical activities have been considerably curtailed; "however, one area, that of serving my Temple, has not suffered one iota." He says that when his office was located downtown in the "National Shawmut Bank Building on Devonshire Street in Boston, I occasionally met **Barney Gordon** and **Hy Ullian."** Says his daughter and family live in Westbury, Long Island, so that contacts are mostly by telephone. His son-in-law "has acquired five scientific bowling alleys over the past four or five years" which keeps him everlastingly busy. . . . And so the column comes to a close again, with the reminder that the next reunion (the 48th, no less!) is just about here—June 12, 13, 14. In the meantime, help keep the little old column full and interesting by writing a little but often.—**Harold F. Dodge,** Secretary, 96 Briarcliff Road, Mountain Lakes, N. J.; **Ralph A. Fletcher,** President, Box 71, West Chelmsford, Mass.

'17

Some strange quirk has temporarily substituted poetry at the beginning of these notes for doubtful jokes at the end. Therefore this month's contribution is a toast to May by Bliss Carman, 1861. "Here's to the day when it is May, And care as light as a feather, When your little shoes and my big boots, Go tramping over the heather." Let's Go! . . . The following is from a friend of **Jack Wood:** "Some 300 current and past generations of intercollegiate sailors and New England yachtsmen joined in a stupendous 'Salute to Jack Wood' at the Algonquin Club in Boston on February 8. The dinner and evening program was sponsored by the New England Intercollegiate Sailing Association. One Jack Wood sailing protegé came from Peru for the occasion, another from Oxford, and many other sailing groups were represented. Heads of many of the formal sailing organizations and leading yachting figures gave oral tribute supplementing the bound volume of letters included in the presentations. The dominant theme was appreciation for help in various forms, from individuals, from representatives of schools and colleges, and from associations triggered and aided generously by Jack over a period of 30 years. Jack and Helen were told that their sailing protegés had underwritten the travel and all other costs of their attendance at an international sailing regatta to be held in England in 1965. A framed award cited Jack as 'The Builder of Yacht Racing in College Sailing.' They will spend this summer on a lecture tour through Canada, meeting with various Canadian sailing clubs and presenting part of Jack's large library of sailing films. When Jack told his father—now 93—that he retires from M.I.T. this year, his father's only comment was 'Have you got a job?' At this retirement dinner, Jack looked young and spry enough to make the question pertinent."

Robert M. Blackall, former owner and president of the Clement Company in Bay State, died suddenly at his home in Easthampton, Mass., on December 30, 1963. He was 74 years of age. He received a B.A. degree from Harvard in 1912. At Harvard, he was active in athletics, winning his letters in hockey and football. He was a member of the staff of the Harvard Crimson. In 1917 he received his B.S. in engineering at M.I.T. and in 1918 his S.M. in architecture. Also in 1918 he was awarded an M.I.T. traveling fellowship in architecture and in 1920 a Rotch traveling scholarship in architecture. He entered the practice of architecture but during the early 1930's

was forced to give up this work. In 1934 he purchased the Clement Company, which manufactured silverware. He served as treasurer of the Board of Missions of the Diocese of Western Massachusetts, Protestant Episcopal Church, from 1939 to 1946. Following his retirement from the Clement Company after its sale in 1957 to the Northampton Cutlery Company, Mr. Blackall took courses in pomology and in the general care of fruit trees at the University of Massachusetts. He was also interested in woodwork and ceramics. He traveled extensively in this country and abroad."

This issue of class notes was planned to feature messages from your class president, regional vice-presidents, and committee chairmen. First, a few words from President **Al Lunn:** "Your president finds retirement exciting and challenging but with days and evenings that are much too full. Some of these activities consist of board meetings, with a liberal assortment of educational, charitable and community projects. One of the most exciting of these is the Franklin Institute of Boston, an opportunity school for engineers and technicians which has about 1,400 students. As many of you know, this institution represents the fruition of Benjamin Franklin's bequest to the 'Town of Boston' of £1,000 to be loaned at interest to young artificers who were starting their own businesses. The income and principal were to accumulate for 100 years and the fund was then to be paid to the city for an important project. Dr. Pritchett, then President of M.I.T., was chairman of the Board of Managers of the Franklin Fund when the fund matured, and it was decided that an opportunity school would best meet the criteria of usefulness established by Dr. Franklin. The school is flourishing but like every educational institution needs money. . . . Another activity which consumes considerable time is headed by **Ray Stevens.** He is president of the Massachusetts Small Business Investment Corporation, and I am on his board and executive committee. As most of you know, we had a very successful interim reunion last June at Sturbridge. Those who attended are enthusiastic about adtional get togethers before our 50th. The New York gang, with **Dix Proctor** as their spokesman, suggests that we consider a trek to New England mountains in 1964, when the fall color is at its peak, which is usually about 12 October. We would be glad to have your comments about this and any other suggestions for interim reunions. Please write our secretary soon. . . . We decided after our 45th Reunion that we should immediately make plans and reservations for our 50th. Our very efficient reunion committee, headed by **Tubby Strout,** made a complete survey of the area from New York City to Maine and finally decided that Chatham Bars Inn at Chatham on Cape Cod offered the best facilities. Our reservations have been made and I am sure that you will hear more about this from Tubby. The success of our Sturbridge reunion was also due to Tubby's meticulous planning. I don't want to steal the thunder of the other officers and chairmen, so will sign off with best greetings to all. Start planning now for our 50th; we want to make this the best one of all time."

Our next note is from our Treasurer, **Loosh Hill:** "I must admit to being quite lacking in witticisms due to the state of affairs on this globe at this time. What with the Beatles taking New York by storm, the Cubans taking us for a buggy ride, and the muss we are in at Vietnam, I just can't get witty. Instead I submit the following which was written by Josiah Gilbert Holland who lived from 1819 to 1881. The reference came about some time during the Civil War I think.

God give us men. A time like this demands
Strong minds, great hearts, true faith and ready hands!
Men whom the lust of office does not kill,
Men whom the spoils of office cannot buy,
Men who possess opinions and a will,
Men who love honor, men who cannot lie.' "

. . . **Ray Stevens** in his capacity of class vice-president and chairman of the 50th Reunion Class Gifts Committee writes: "The request for a report on activities from officers and committee chairmen and their aides catches me a few hours before I leave for Naples, Fla., for a month. Most of my time, more than I expected or planned, has been given to the Massachusetts Small Business Investment Company in an area that I find extremely interesting and where there seemed to be plenty of opportunity for effort and problem-solving." . . . **Al Moody,** Regional Vice-president for the Rocky Mountain District, says: "I can't do much more than say 'Hello' but I am glad to do that. Since returning to Denver in August, 1962, from my 16-month stay in Houston, Texas, we have stayed fairly close to home. We have made several trips to Winnetka, Ill., and Albuquerque, N.M., to see children and grandchildren, in addition to short trips around here to Longmont, Colo., and Colorado Springs for the same purpose. Last spring we went to Texas and Arkansas to see old friends. Trips of this kind keep us busy."

Tubby Strout, Chairman of our 50th Reunion hotel arrangements committee, writes: "Plans to hold our 50th at Chatham Bars Inn are still in effect. I went over there last summer and it was just as lovely as ever. We have first option on the rooms and cottages which is all to the good. Route 3 is now completed so it is throughway all the way from Boston to Chatham, about 1-¾ hours drive. Coming in from New York means going through Providence which up to now is a headache. However, they're working on a lot of highways in that area, and may have it all straightened out by '67 . . . I am still active in my commandery work in Boston, get to the Alumni Council once in a while and do a little local civic work here in Osterville. Right now, I am in the middle of running the Heart Fund house to house drive with 70 women workers so you can imagine what that is." . . . **Justin Basch**, Regional Vice-president from Philadelphia, is still a working man as you will note from the following: "The class notes these last few years have made me drool as I read all the varied activities of our retirees. They sure have more time to do what they would like to do than does a working man. December 1 is my mandatory retirement date to join the ranks of the 'pleasure only' employed. This year has been an unusually busy one as new executives are being trained to take over. I did find time during the Christmas Holidays to visit children and grandchildren in Indonesia. On this round the world trip, we added three weeks in Israel, India, Thailand and Hong Kong. Unfortunately, I have missed too many M.I.T. luncheons and dinner meetings. In 1965 I hope to rectify all this and better do my 1917 class chores."

Ken Bell, who officiates as chairman of indoor entertainment for our 50th, writes from Mirror Lake, N.H. "We made a short trip to visit our family, and spent the night with **John** and Sally **Holton** in Skeneatles, N.Y. John has a beautiful home on a hillside, overlooking the lake, and is having great fun developing the property-plantings, etc. . . . I am still an incorporator on the New England Baptist Hospital Board of which **Stanley Lane** is president." . . . Your assistant secretary and M.C. of the New York City 1917 monthly class luncheons, **Dix Proctor,** states: "The luncheon this month (February) was signalled by the return of **Bill Hunter** from his tour of duty in Europe for Singer. He looks fine and enjoyed his work in Europe. He considers himself an expert on marketing in the Common Market area. He has returned to Plainfield, N.J., to live. When mentioning our monthly luncheons at the Chemists' Club, 52 East 41st St, N.Y., please suggest that instead of asking for me they look at the bulletin board for the location of the 1916-1917 group. You know that we take off early in May on a cruise out of San Francisco on the 'S.S. President Tyler'."

Tom Meloy, Regional Vice-president for the Washington D.C., area, writes: "I am still holding forth as chairman of the board of Melpar. I am also chairman of the board of Isomet Corporation. In Palisdades Park, N.J., which is in the field of nuclear chemistry and physics. I think we are number one or number two in the nation in the growth of special crystals, such as lasers, scintillation crystals, X-ray crystals, infra-red, light modulators, and we are the only producers of Nitrogen 15. In fact, I think we do the largest business in stable isotopes. Our business is about 50 per cent government and 50 per cent commercial. I am having a lot of fun with this company. We have built it up to about a million dollars a year in sales. I also have an interest in a couple of laboratories in the Boston area, one in Cambridge and one in Natick. . . . This year I have served as chairman of the board of the National Security Industrial Association and am presiding at the Forrestal dinner. I am a director and trustee of the Woodrow Wilson Rehabilitation Center Foundation and am engaged in fund raising therefore. All in all I have had a pleasant and busy year. I commute to

New York and frequently to California."

Class Agent **Ray Brooks** writes from Summit, N.J.: "I could really write a book if I had ability to locate some time. I still have too much to do, but every day is a new adventure, say I. The only report from Ruth and Ray Brooks is: Cape Cod (good old Massachusetts) Summit, New York City once in a blue moon, and presently a reservation to go to South America's west coast if we can get through the Canal. I've been down to the Isthmus but I hope things will have quieted down so Ruth can enjoy Panama as I did previously in passing through. On the last trip we had Cuba trouble down that-a-way yet hope springs eternal for us to have clear sailing on this voyage. . . . As to the Class of 1917, may I, as Class Agent, say that we may, at the present rate, have reason to feel good about our standing in the loyalty and giving departments. New names of donors to the Alumni Fund are particularly gratifying particularly since every new and added dollar towards the million goal is counted right now into our 50th Class Gift Total. I can't impress too much on those not yet in this year's Fund that, no matter how much the amount of money involved, it is a classmate's name in the list that gives a whale of a morale boost to the fellows working behind the scenes in behalf of the class."

Howard L. Melvin, Regional Vice-president for the Pacific Coast, is a loyal '17er although he was with the class as a graduate student for only one year. He contributes the following: "I continue to enjoy retirement living in Los Altos Hills, and golfing, fishing, taking auto trips to interesting California places and the Northwest, including Canada. In 1961 I joined my old classmates at Washington State University for our 50th Reunion. I have very limited engagements as a consulting engineer and retain interest in the profession. Recently, I was on the area I.E.E.E. program 'Pioneers of Electronic and Electrical Engineers' to cover the topic of 'Power System Developments prior to 1930' along with other panel members representing manufacturing, communication and education. A call from any '17 man passing through or living in the Bay area will get a welcome." . . . **Stan Dunning** and wife have been spending the winter in Naples, Fla. You have already noted that Ray Stevens is spending a month there, which promotes the suggestion that the class establish a base in Florida for the winter months and invite all who go to Florida in the winter to join in a more than a few days reunion.—**W. I. McNeill,** Secretary, 107 Wood Pond Road, West Hartford, Conn.; **C. D. Proctor,** Assistant Secretary, P.O. Box 336, Lincoln Park, N.J.

'18

The beginnings of spring beyond my window pane are burgeoning in bright, glorious, splashing colors, similar in some ways to the lovely colors **Elmer Legge** has been observing all these years in the heat treating of metals. Four years ago he retired from the Hamilton Standard Division of United Aircraft at Windsor Locks, Conn. But to begin at the beginning, when he got snatched from the academic halls by the hot hand of the first World War. Elmer served at the Watervliet Arsenal until he went back to M.I.T. for a course in metallurgy, then on to McCook Field as a non-ferrous metallurgist. Sensing the color of his future, Professor Fay brought him back East as steel expert for the Winchester Arms Company at New Haven, following which he became director of research at the American Steel and Wire Company in Worcester. But colors change with heat treatment, and Elmer's became still brighter in 1941 as vice-president and general manager of the Hart Manufacturing Company, all of which was sharpened by some consulting for the Schick razor people. In 1949 he changed to general manager of the V and O Division of Emhart Manufacturing Company, which **Don Merrill** served so brilliantly and so long in research and development. In 1956 Elmer joined Hamilton Standard. He retired in 1960 and now lives in South Yarmouth on the Cape, where he still does some consulting, in addition to mowing the green grass and sometimes watching the deep blue sea with various of his eight grandchildren. To go back, Elmer attended high school in Brockton with **Sherman MacGregor.** Could that have been over half a century ago?

Whenever **Julian Leonard** looks out his window pane he sees spring in terms of the implications reflected from the buildings and the city streets visible from Longwood Towers in Brookline. The gentler pastels he enjoys at his summer place in Marion. Julie used his Course XV training to become a licensed insurance consultant and a believer in the renewal of life. He retired in 1961 from the John Hancock Life Insurance Company to do a little business on his own, to enjoy five grandchildren, to engage in some church work, and to watch spring come at the Brookline Country Club. . . . A note from **Gretchen Palmer** says that the traditional routine of her life as the parish secretary of Saint Andrews was relieved in December by a colorful week's trip to Bermuda where the mean annual temperature is 70 degrees and the minimum only 49. She says the island is wonderful and warm but Buffalo is cold. Do you suppose she could mean that the warmth of friendship and appreciation is lacking in Buffalo? Surely her classmates have not been lacking in esteem for and gallantry toward her since the days when she and **Charlie Tavener** were in Sunday School together at Mattapan. Well, maybe there was some irresponsible—albeit colorful—deviltry the time one of us sneaked a can of beer beside her chair in German class. As we were leaving Professor Blackstein said: "Miss Palmer, haven't you forgotten something? Didn't you leave your medicine behind?" Surely the yeast of reconciliation was not long in working afterward, all of which brings us a spring flood of freshly-dusted off memories, including the fact that Blackie used to bring opera glasses for his more intimate view of the Tech Show.

Our brightest color in these beautiful and tempestuous times continues to be **Bill Foster.** Expressing in a single wondrous sentence a tragedy which is not arguable by either side, after six more weeks of wrangling with Russia's "Scratchy" Tsarapkin in Geneva, Bill said: "While we negotiate the arms race goes on—on both sides." In the two years since the Geneva talks began, he points out, our strategic missile inventory has more than tripled, and next year will approximately exceed that of 1962 by 750 per cent. Most appropriately, he will be the keynote speaker at the 17th annual national A.I.R.C. conference to be held at the Sheraton-Chicago Hotel April 1-4. The Arms Control and Disarmament Agency, which Bill heads, is determined to achieve world peace through world law. Any other way is unthinkable. The necessity for such an agency which would "1) give to our disarmament negotiators continuity of direction, 2) administer the political and scientific research needed for developing sound national security policy on arms control and disarmament, and 3) insure the constant and full-time application of U.S. resources toward reducing the danger of war" has long been apparent. Bill has had extensive experience, both in government and industry. He was at one time chairman and president of United Nuclear Corporation and executive vice-president of Olin Mathieson Chemical Corporation. He has served as deputy secretary of State, 1951-1953, administrator of the Marshall Plan, administrator of Economic Co-operation Administration and under-Secretary of Commerce, 1946-1948. Language is also a colorful thing to those with the eyes to see. Further considering Bill Foster's endeavors, take, for example, Abraham Lincoln's marvelous phrase: "To nobly save or meanly lose the last best hope of earth." How profoundly it applies to us. But also, how the beauty of its English would be changed into words set askew to the ear by some pedant who objected to a split infinitive!—**F. Alexander Magoun,** Secretary, Jaffrey, N.H.

'19

The big news for all members of 1919 is our 45th Reunion in June. As announced in the notes last month, we will meet June 12-14 at the Chatham Bars Inn, Chatham, Mass. **Will Langille** reports that he has received many responses to his first mailing and a large attendance is assured. Those who are definitely going as recorded by the first of March are: Langille, Way, Smoley, Paterson, Flynn, McCarten, Braverman, Michelson, Sheeline, Sorenson, Hough (he has moved to Chatham), Bristol, and Webster; also, Palmer, Kelley, and Blye. Some of the boys are committed to other activities, and we will miss them. . . . One of the refusals comes from **Karl Rodgers,** who writes that he and his wife will be sailing at about that time from Houston, Texas, for a few weeks in Southern France. They sold their home in New

Jersey, and are enjoying living in an Airstream travel trailer. . . . We have received a copy of an article by **Ezzie Paterson** written for the Bell Laboratories Record on "Quality Assurance."

Isidor Slotnik has been re-elected to his third term as president of Boston's Beth Israel Hospital. The hospital is proceeding at a rapid rate on a big development program. Beth Israel is one of seven teaching hospitals affiliated with the Harvard Medical Center. . . . Word has been received of the death of **W. Kenneth Pike,** of Santa Fe, N.M., on January 25, 1963. Also, **Victor N. Samoyloff,** of Vineland, N.J., died on December 11, 1963, at the age of 86. Dr. Samoyloff, who was a graduate of the St. Petersburg Imperial School of Mines, took postgraduate work at M.I.T. He worked for several years in Bolivia at the Patino mines, reputed to be at the highest elevation of any mine. His later work took him to many countries of South and Central America and Mexico. He retired in 1951 and settled in New Jersey.—**Eugene R. Smoley,** Secretary, 30 School Lane, Scarsdale, N.Y.

'20

Your secretary represented the class at the annual Fiesta of the M.I.T. Club of Mexico City in mid-March. This is a truly delightful event, superbly organized and conducted for three wonderful days in that exciting and colorful city. It merits the support of every loyal alumnus. Now that most of us have more time for travel and recreation, I am doing you a very real favor when I suggest that you include Mexico and make a special point of timing your trip to include the Fiesta, which always takes place in March. If you want further details for next year or thereafter, I shall be glad to get them for you. I doubt if you can find a finer and more dedicated group of alumni anywhere in the world than you will find in Mexico City. . . . **Harold Bibber** was recently awarded the Union College Alumni Certificate "For devoted services to Union College." The certificate citation included the following comments: "During the 12 years you headed the Department of Electrical Engineering and the several terms you served as chairman of the Division of Engineering, you earned for Union College the commendation of the United States Navy for developing a high level of engineering training during World War II. You recruited a new, highly qualified faculty staff for the Electrical Engineering Department, re-established a graduate studies program leading to the master's degree and suggested the establishment of the five-year program combining liberal arts and engineering leading to two bachelor's degrees. This is now one of the most distinguished offerings the College has for students seeking careers in engineering or industry.

"The extraordinarily successful teaching aids you developed for the department have become nationally known since they were incorporated into two books, the most recent being "Effective Teaching," published by McGraw-Hill. You have served your Schenectady neighbors through your Adult Bible Class at the First Dutch Reformed Church. You have served the international community through your work in the International Conferences on Nuclear Engineering. You have been devoted to your alma mater, M.I.T., where you began your teaching career." To all of which your classmates say "well done, loyal and distinguished friend."

John Barker's retirement from the Maine Medical Center, where he was director since 1958, was featured in Portland newspapers recently. John was plant engineer of Maine General Hospital in 1945, then became assistant director. He is a member of the American College of Hospital Administrators, American Hospital Association, New England Hospital Assembly, active in many community enterprises and a director of the Cumberland County Tuberculosis and Health Association and a trustee of the Maine Home for Boys. Again, your classmates say "well done." . . . **Witold Kosicki** is justly proud of his daughter for winning the grand prize of $25,000 in the Pillsbury Bake-Off. Her winning recipe, "Hungry Boys' Casserole," combines hamburger and two kinds of Italian beans with a topping of almond-olive biscuits. . . . **El Wason,** of the famous twins, has moved from Waban to Wellesley Hills, address, 9 Edgewater Drive.

The death of **Ed Rolle** has been reported. He was located in San Diego; we have no details at this time. . . . To **Robbie Robillard** we are indebted for information on the sudden untimely death of **Heland Green.** Robbie says Heland was associated for many years with **Joe Hennessy** in general housing construction. Joe died some years ago, but Heland continued active until three years ago when he moved to Florida's Siesta Key. He is survived by his wife, Cassie, of 646 Canal Road. . . . Robbie says the new Southwest Florida Alumni Association is doing a fine job and any who get down that way should get in touch with the secretary, Dave Eberly, '48, 2315 Goldenrod Street, Sarasota.—**Harold Bugbee,** Secretary, 21 Everell Road, Winchester, Mass.

'21

It is always most gratifying to learn of top honors which have been earned by members of this newsworthy Class of '21 and here's another important recognition: **Glenn Stanton,** former national president of the American Institute of Architects and a member of our famous group of architects from 1921 on the West Coast, has been presented with the first award ever given by the Oregon Building Congress to an individual for outstanding public service. The citation reads: "The Oregon Building Congress presents to Glenn Stanton this certificate in recognition of his unselfish contributions to the ideals on which the Oregon Building Congress was founded. His multitudinous activities in the promotion of high standards of excellence, competence and ethics throughout the building industry have brought international recognition not only to him but also to Oregon as a whole." Glenn is a fellow of the A.I.A. and a senior member of the architectural firm of Stanton, Boles, Maguire and Church, 208 S. W. Stark Street, Portland 4, Ore. He is an honorary fellow of the Royal Architectural Institute of Canada, honorary member of the Royal Institute of British Architects, corresponding member of the Philippine Institute of Architects, a past-president of the Oregon State Board of Architect Examiners, member and past-president of the Portland City Planning Commission. He has written many articles on city planning and various phases of the architectural profession. His clubs include the Arlington and University Clubs of Portland; Century Association, New York; Cosmos Club, Washington; and the Tavern Club, Chicago. Hearty congratulations, Glenn.

Our class vice-president, **Irving D. Jakobson,** and his lovely wife, Ruth, were also featured in the news on a television broadcast anent the New York World's Fair. It seems that the well-known Jakobson Shipyard, Inc., of Oyster Bay, N.Y., played a major part in refurbishing the good ship "Bounty" (ex-Hollywood and the "Mutiny of"), which the movie colony sent East for mooring in the World's Fair marina as a floating attraction. Maxine and your secretary were just sitting here, doing nothing but watching a television news program when, all of a sudden, Jake and Ruth appeared with a host of Gotham notables and dignitaries on the deck of the "Bounty," as she was being taken from Jake's shipyard to the Fair. Last year's winner of the Silver Stein never looked prouder or happier, even when his sleekest yacht design eased down the ways into the Sound. A hasty telephone call revealed that he was away on business, but we were glad to learn from Ruth that son Peder, recently made a corporal and named "Soldier of the Month" at Fort Dix, was home on leave to celebrate his 21st birthday. When you visit the Fair, remember the "Bounty."

Viviano Valdes and **Manuel Sandoval Vallarta** were members of the committee which arranged the colorful 16th annual Fiesta of the M.I.T. Club of Mexico City last month. . . . Dr. **Thomas P. Campbell** gives a new home address as 840 Gaylord Street, Denver 6, Colo. . . . **John J. McCloskey** writes that his home is off of Glen Drive in Whitinsville, Mass. . . . **Richard H. Morris** and Mrs. Morris have returned from their world tour and are making their retirement home at 2416 Third Street, Santa Monica, Calif. Dick was the editorial director of the Technical Publishing Company of Barrington, Ill. . . . **John T. Rule,** Professor of Mechanical Engineering at M.I.T., will be found at his office, Room 1-111 at Technology. . . . **Henry C. Taintor** has retired from the Napersville, Ill., engineering staff of the Natural Gas Pipeline Company of America and is living at 88 Harvard Drive, Ormond Beach, Fla. . . . **Sumner Hayward** has just undergone sur-

gery in a hospital near his home and Betty tells us he is recovering rapidly but further rigorous treatment is anticipated. Sumner retired after many years with the New York Telephone Company and makes his home at 224 Richards Road, Ridgewood, N.J., where our good wishes are directed. . . . Sincere sympathy is extended to **John D. Crecca** of Elizabeth, N. J., captain, U. S. Navy, retired, on the passing of his mother. . . . Dayton T. Brown, Inc., of Bohemia, L.I., N.Y., which is headed by our **Dayton T. Brown,** made the headlines with a major award from the U. S. Navy for quality control testing. . . . **Joseph Wenick,** former chief engineer of Lightolier, Inc., Jersey City, N.J., says he is in semi-retirement and now serves as a part-time consultant for the firm. . . . **Robert S. Cook** reports from his winter home at 633 Royal Plaza, Fort Lauderdale, Fla., that he was discharged from the Massachusetts General Hospital, following operations on both hips. He writes that he will be on crutches most of this year and unable to travel.

A. Warren Norton gave us a most pleasant surprise by phoning from New York to inquire about the progress of our physical condition. He anticipated our usual question about automobile seat belts and assured us that he and Helen never fail to put them on. Warrie maintains his busy office in midtown New York City, he lives in White Plains, N.Y., and has a summer home on Long Island Sound. Commenting on the suggestion made by the Reverend **Everett R. Harman** that the Class of '21 visit several National Parks, Warrie says they have traveled extensively in Europe and have also seen many of our National Parks. He feels that most of us overlook the grandeur in our midst by assuming we must travel to far-away places. The Norton's elder son is married and lives in Chicago. He has two daughters. Their younger son is also married and lives in Milford, Conn., with his family of three daughters, comprised of twins and a younger girl. . . . Announcement has been made by the United Aircraft Company of East Hartford, Conn., that **John G. Lee** retired as director of research on February 1, 1964. A native of Chicago, John received his bachelor's degree with us in Course II and went on to obtain his master's degree in aeronautical engineering a year later. He served as an instructor in aeronautical engineering at M.I.T. for two years and then held aeronautical posts in industry before joining the Chance Vought Aircraft Division of United Aircraft in 1932 as a project engineer. He became assistant director of the research department in 1939 and director of research in 1955. He is chairman of the board of regents of the University of Hartford. His son, John, M.I.T. '51, is a project engineer at United Aircraft. It is interesting to note that John's successor as director of research is the former chief of research, Wesley A. Kuhrt, M.I.T. '39.

Our seance with a seat belt has prompted more members of the class to write warm personal letters, and we are so pleased and appreciative that mere words are inadequate to express our thanks. Writing from his office at 31 St. James Avenue, Boston, estate planner **Harry A. Goodman** says, in part: "It was with mixed feelings that I read of your serious accident—disturbed about the seriousness but most pleased that you came out of it in one piece. I had meant to write to you some while back. May I trust that you are none the worse for your sojourn in the hospital and are as good as new. I was very sorry to read of **Herb DeStaebler**'s death. When he was at the Massachusetts General in Boston, I was told that he was seriously ill. I wrote to him and his reply was so pleasant and unconcerned that I was amazed at his courage. The only thing that bothered him was how I found out he was in the hospital, until it dawned on him that **Bill Wald,** who had visited him, had called me. I tried to reach Herb by phone, but he had already been discharged. I had hoped it was for the better, but then I learned he had an incurable disease." Harry adds that he and Sarah spent some time in Miami and had an opportunity to get together with **George** and Anne **Schnitzler** there. As though by pre-arrangement, a letter followed from Anne and Bill Wald, postmarked at White Sands Beach, Montego Bay, Jamaica, B.W.I., saying: "Glad you're better. Hope to see you in June and perhaps in Spain in 1965. We were grieved to hear of Herb DeStaebler's death. Bill had had dinner with him and his son in Cambridge last summer, prior to his operation. We visited him a few times after that at Phillips House. The last word we had from him was at the end of August, when he told us he had been retired about two days. We answered, but that was the last we heard. We have had a lovely vacation here and we understand there's snow and ice awaiting us in Boston." A postscript calls attention to the special stamp that was affixed for our collection—one of the new "Miss World" series depicting the comely "Miss Jamaica 1963," who won the title of "Miss World 1963." Many thanks, Anne and Bill, and may the sun shine bright on 86 Griggs Road in Brookline, Mass.

Ralph M. Shaw, Jr. has written a detailed account of the trip which he and Madeline made abroad. Rufe says, in part: "We spent Christmas with our daughter, Mary, in Wiesbaden, Germany. She is married to Major Bob Scott of the Air Force, who is stationed there, and they have a son, Ralph Martin Shaw Scott, who is seven. After the holiday, we all went to Egypt for a couple of weeks to thaw out. We first went to Switzerland so I could get some service on my watch. I ended by buying another. I cannot resist the sales appeal of a Swiss watch. We stayed at the Baur au Lac Hotel, quite the best in town and always crowded in summer. Zurich was empty and it looked strange to walk down Bahnhofstrasse and see parking spaces on both sides. There was little vehicle or foot traffic. We left Zurich and crossed the snow-covered Alps, which were gorgeous. We spent five days in Cairo. Mary and Bob rode camels. I did, too, but without enthusiasm. Then we shoved off for Luxor. I had spent three months in Luxor in 1912. My mother was valedictorian at Bryn Mawr and a Rhodes Scholar at Oxford in archaeology. [At that time] she was engaged in excavating the Tomb of the Kings for Chicago University. I could not identify the tomb she had excavated. Next we visited Karnak and from there we went to Aswan. The British have built a dam there and Nasser is building another upstream. The new dam is the famous High Dam that John Foster Dulles tried so hard to persuade Congress to build. The Russians are building it now.

"We embarked on a boat driven by a diesel engine for the three-day trip to Wadi Halfa and Abu Simbel, the temple which will be flooded by the High Dam. Foreign aiders wanted us to raise it. President Kennedy allowed he could use the money a lot more wisely for other purposes. Now the Germans and Norwegians are trying to do it. They have quite a job on their hands. It was a lovely trip with a most interesting group of fellow passengers. The crew, all Arabs, drank the waters of the Nile, as is. They did not have bottled water, so I compromised on vin du pays, in this case Cleopatra white wine, whose alcoholic content was six per cent. Try and drink nothing else! I like wine, but not in the morning as a chaser for thyroid pills. However, it was the Nile or Cleo, nothing else! We got back to Aswan and, by nightfall, we were in Cairo, via an Arabian Airlines jet which took us there in an hour and a half. The train takes 24 hours. The next day we were in Rome, where we picked up our overcoats and galoshes. Another day and we were in New York at the beginning of the big snow storm. It was a grand trip, but I am glad to be home." As we complete these notes, a post card has just arrived from Rufe, mailed from the Pink Sands Lodge, Harbour Island, Bahamas, with a message reading: "We are enjoying a week on the outer islands of the Bahamas. One of our fellow guests is a hard rock miner from Course III, **Dan Harvey** of Kennecott Copper, sojourning here with Mrs. Harvey." Rufe's contributions to these columns make us proud to be an honorary member of Course VI-A. (Comments from **Dug Jackson** will not be accepted for publication!)

The late Herb DeStaebler's popularity is further attested by a welcome letter from **C. Wentworth Richards.** Dick, who lives at 2 Lanvale Road, York Haven, Pa., says: "For ever so long, I have been meaning to write you and the news in your February notes about Herb DeStaebler's death has finally triggered me into action. Herb and **Buck Buckner** and I were the only '21ers in this area. Herb had been quite active in the M.I.T. Club of Central Pennsylvania before I became active in the organization. I shall miss him at our meetings. Strange that I should hear of the death of such a near neighbor in so roundabout a manner. As for myself, I am still manager of the International Paper Company mill in York Haven. I have a married son, two grandchildren—a boy of six years and a girl

aged two and a half—all living in Ridgewood, N.J. I have often thought of looking you up when I visit them. My wife, Barbara, who is not known to any of the class, except possibly **Fred Adams,** is well, and we are looking forward to retirement in September of 1965. Of all things at this advanced age, I have become a ham radio operator, which looks like a wonderful retirement hobby. Just in case there are other 1921 hams, my call is K3RSA and I operate on 10 meters through two meters, single sideband and AM on the HF bands and AM only on six and two meters. I would love to arrange a schedule with anyone who is interested. The only address needed is York Haven. This is a thriving metropolis of 750 souls, three groceries and general stores, two bars and two churches, so everyone in town knows everyone else. We call for our mail at the post office, where they are now quite accustomed to cards and letters addressed only to K3RSA—Dick. After this long span of years, I find it difficult to tie names to personalities in The Review. I was Course X in the junior freshman group that graduated with the main body of 1921. I find your notes in The Review most interesting and think you do a remarkable job." Dick is a vice-president of the M.I.T. Club of Central Pennsylvania. Let us know next time you plan to be in Ridgewood, Dick, and we will arrange a session with **Sumner Hayward,** also Course X, who lives in Ridgewood.

Reminder: Come to Alumni Day next month on campus in Cambrdige and join a host of your friends from 1921 and our neighboring classes. The date is June 15, 1964. The program has been mailed to you by the Alumni Association. Send for your reservations now to the Alumni Office at M.I.T., Cambridge, Mass. 02139. Let your secretaries know if we can be of assistance. Meanwhile, keep those letters coming in for these columns. If you visit the New York World's Fair, call **Cac Clarke** in New Jersey and give your news in person. During the day phone 201-262-8000, Extension 483; at home in Glen Ridge at 201-743-4059 and most weekends at Brielle at 201-223-4698. Many thanks.—**Carole A. Clarke,** Secretary, c/o ITT Data and Information Systems Division, Route 17 and Garden State Parkway, Paramus, N.J. 07652; **Edwin T. Steffian,** Assistant Class Secretary, c/o Edwin T. Steffian and Associates, 376 Boylston Street, Boston, Mass. 02116.

'22

The Class of '22 is in trouble this month because the assistant secretary, **Oscar Horovitz** is on a prolonged southern jaunt and your normally faithful secretary is completing a Chamber of Commerce cruise around South America with a stopover in Peru. It is hereby recommended that the March notes for the May issue be arranged for future omission because of this constant neglect of duty. Last year he was in HongKong, the year before in Moscow, so there is very little hope for the next year with this habit fully confirmed. . . . As a reminder, do not forget the 45th Reunion on Cape Cod at the Wianno Club. . . . It has been announced that **Samuel H. Reynolds** has been appointed vice-president in charge of sales by the Great Lakes Carbon Corporation, Graphite Products Division. Best wishes from the class on this promotion. . . . **Crawford Greenewalt** proudly called attention recently to a pair of shoes which he has been wearing almost daily for a year and a-half. They were made of a new product, manufactured by Dupont, called Corfam. It looks and feels like leather, but wears better and needs less care. It is water-repellent, yet it lets your feet "breathe." We anxiously await the day when this new marvel becomes available to the public.

In the absence of your secretary, his Girl Friday has scanned the mail for items of interest to the Class of '22. **Whit Ferguson** has sent colorful and interesting cards from the far-away places he is visiting. One in particular is especially noteworthy. It is from the Hotel Quitandinho located 3,000 feet up a mountainside and is reached by climbing switchback roads. It is located at Petropolis, and is a popular summer resort. While our beautiful mid-winter summer weather has disappeared from Buffalo, and many inches of snow has clogged its thoroughfares, he writes of hot, humid weather with people in swimming from 6:30 A.M. to midnight. The spring sun however, will soon wipe away the vestiges of winter from his home base also. He was very pleased with Sao Paolo, a huge city of five million with a temperature of 78 degrees. He had dinner with the governor and mayor and was delighted with the nice people he met.

The sympathy of the class is extended to the family of **Edward Morse,** who passed away on January 16 after a long illness. He is survived by his wife Lillian and two sons, William W., 3d, of Charleston and Donald W., of Groton, Mass. . . . There have been several change of addresses to note: **George E. Taylor,** Fort Myers, Fla.; **Donald D. Stowe,** Ozona, Fla., and **Gordon A. Cushman,** Naples, Fla. . . . These items were written per the instructions of Whit Ferguson as he ran out of the office shouting "Remember the notes"! So the notes have been remembered and a more complete article can be looked forward to in the subsequent issue of Technology Review.—**Whitworth Ferguson,** Secretary, 333 Ellicott Street, Buffalo, N.Y.; **Oscar Horovitz,** Assistant Secretary, 33 Island Street, Boston 19, Mass.

'23

A picture in the Andover-Newton News Reporter for February shows **David Skinner** of Newton Highlands, as one of the leaders in the Andover-Newton development program, a $4-million long-range development program to be complete by 1970. . . . No news items arrived from the Alumni Office for May. The deaths of **Hawley S. Young** of 52 Pond Street, Needham, on February 6, and **John M. Keck,** on January 28 at the Migeon Manor Convalescent Home in Torrington, Conn., were reported with no details. . . . An address change was received for **Kilburn M. Smith,** 521 South Fig Tree Lane, Fort Lauderdale, Fla.—**Forrest F. Lange,** Secretary, 1196 Woodbury Avenue, Portsmouth, N.H.; **Bertrand A. McKittrick,** Assistant Secretary, 78 Fletcher Street, Lowell, Mass.

'24

In early March your Acting President **Paul Cardinal,** Reunion Chairman **Cy Duevel,** and your secretary met in Cambridge to settle final details of our big 40th in June. Cy reported the response has been good to date. There is no point in giving figures here, since you will have had another letter from him before you see this. It may be in order to point out, however, that at least three of your classmates are coming from the West Coast and two from Mexico, with their families. And some will be there who have never before attended a reunion. It will be fun. . . . You have also had a letter from **George Knight** about our 40-year gift, and hopefully have given it serious thought. A good many have, and acted on it. . . . **Ray Lehrer,** our Reunion Gift Chairman is touring Africa, as you know. Right after sending that letter, George, the Vice-chairman, also took off for Africa. To the best of our knowledge it was not for the purpose of holding a strategy meeting. The Knights have a daughter and son-in-law somewhere in North Africa, and they hopped over to pay them a visit. If they all come back loaded with pictures we may have an African travelogue at reunion. Probably others as well.

The **Malcolm H. Finley**s are among those coming from California. Mal was with us last at the 25th. He is a psychiatrist and says: "Believe it or not, M.I.T. basic science training has played a significant part in my work." We can believe it, and so will those of you who come up to the Institute for Alumni Day. You will hear a lot about some diverse and amazing work going on in the medical sciences. . . . The **Harold Young**s are using the Oyster Harbors Club as a stopover between California and Europe. They will be off on a four-month jaunt. . . . So are the **Rutillo Torres** from Guadalajara, making this a way station on a round-the-world trip that lands them in New York on June 8. And the **Clarence Cornishe**s will be on hand, "that is if we survive the double wedding of our daughters Vicky and Paula on May 23."

Phil Bates believes his family has established some sort of record with three sons having M.I.T. degrees. We're sure he's right. Furthermore, they've sprinkled the degrees around, an S.B., an S.M., and a Ph.D. Phil is serving on the Corporation Visiting Committee for the Dean of Students. . . . Another classmate many of us will look forward to seeing again is **Luang Videt-Yontrakich** of the Royal Thai Embassy in Washington. Vi-

Members of the Class of '26 present at the Cleveland Conference on counseling in education in March, included (from the left) Robert A. Williamson, Charles R. Milem, William C. Sessions, James R. Killian, Jr., Frank W. Schreiner, Duryea E. Elmendorf, and Alfred W. French, Jr.

det and his charming wife came to Cambridge for a big affair during the Second Century Fund, the first time any of us had seen him since graduation. . . . Our class has picked up its share of honors and citations through the years, but here is one that's unique. Lambda Chi Alpha Fraternity has presented its "Award for Distinguished Service" to its Chairman of the Board of Investment Advisers, **Prescott H. Littlefield.**

We have three deaths to report. **Stanley P. Fosgate** passed away two years ago, and it has just been reported. Miss **E. Jeanette Culliton** and **James I. Wood** died in January. None of the three was a graduate, and we have no details on any of them. We look forward to seeing many of you in another month and a half, or so. —**Henry B. Kane,** Secretary, M.I.T., Room 1-272, Cambridge, Mass. 02139.

'25

A recent note from **"Chink" Drew** advises that he and his wife are spending the winter in England on a special assignment and will not be coming back to the States until spring. His absence from this country does not mean that he is not keeping track of Alumni Fund contributions and progress towards the 40th Reunion. Contributions to either the 1964 Alumni Fund or to the Class of 1925 Fortieth Reunion Gift will be accepted by "Chink" from his headquarters in Birmingham, England. . . . Additional information regarding new honors bestowed on **Tom Killian** should not be overlooked. Rather recently Tom was elected to a three-year term on the council of the Albertus Magnus Guild, an organization of Catholic scientists. This organization serves as a means of communication between the Church and science as well as between science and the Church. About 3,500 members throughout the country are active in scientific work in colleges, government and industry.

During the past month, belated news of the death of Commander **Harry E. Cooper** has reached your secretary. He died on July 22, 1963, at his home in Melrose, Fla. . . . On March 3, 1964, **Ralph W. Lewis** died at the Mount Auburn Hospital. Ralph was a native of Somerville, Mass., having graduated from high school in that city before attending M.I.T. He had been an engineer with the Stone and Webster Company for more than 20 years and a resident of Belmont, Mass. For many years, he had served as president of the Men's Club of the First Unitarian Church of Boston, and was a member of the Massachusetts Society of Professional Engineers and the Pamet Harbor Yacht Club of Truro, Mass., having been a life-long summer resident of Truro. He is survived by his wife, one daughter and a son. . . . It is not too early to make plans to attend the 1964 Alumni Day on June 15. You may be assured the day will be filled with events you should not miss. Make your reservations early!— **F. L. Foster,** Secretary, Room 5-105, M.I.T., Cambridge, Mass. 02139.

'26

On the way out to Pigeon Cove yesterday afternoon we stopped at a small corner store to buy hamburg for Heidi. It had to be ground, and I remarked that the machine sounded as though it were getting tired, whereupon the proprietor's son gave me a lecture on what a wonderful machine it was and said that the company who builds it is very reliable. I then noted the word Hobart on the machine and could not resist bragging that a classmate of mine was president of their reliable company. He then asked the year of my class. When I said '26 he put the hamburg down on the counter, stepped back and eyed me from head to toe, then remarked: "My but you are in good shape for having graduated so long ago." When I came out of the store chuckling Ruth demanded to know the story. What I was really chuckling about was the fact that if he knew how stiff I was when I got out of bed in the morning he would have withheld his comment. Also I fear he may think that **Guy Frisbie** and I were classmates in a grammar school Class of '26. The above paragraph was written last week. Then the class notes drifted off into a little story about sailing activities at M.I.T. As a result Volta Torrey, Editor of The Technology Review, phoned early this week to say that he would like to use the story elsewhere in The Review, so before summer you will probably see an issue of class notes that

went astray surrounded by pictures of sailboats. Meanwhile I find myself back at Pigeon Cove on a damp, foggy, end-of-winter Sunday morning writing, grinding out a replacement issue of notes to the tune of the groaner on Thatcher's Island a few miles south. It's lucky I always have an envelope in my pocket—here's one on which I recently wrote the following: "This is being written as I await breakfast in a Savarin restaurant at the Grand Central Terminal. As I was approaching the station, my cab stopped at a traffic light and in the dim light of 7:30 A.M. on a winter morning, I thought I recognized **Don King** so I lowered the cab window and called his name. It was Don O.K. and we carried on a traffic-light conversation. Yes, he was on his way to the office at that hour and his office at Union Carbide was just a few steps away. Then I suddenly remembered that Don is a bachelor, which may rationalize the hour that he shows up at work."

Another item I had been saving is the announcement for the last Alumni Council meeting. Here's what it said about the speaker, Dr. **C. Stark Draper,** Head of the Department of Aeronautics and Astronautics, Director of the M.I.T. Instrumentation Laboratory: "Last October, three M.I.T. Alumni were named among the nation's 14 new astronauts. The M.I.T. Instrumentation Laboratory has the contract for development of the guidance system for the Apollo spacecraft destined to take two men to the moon. This forthcoming event was recently described as "the most difficult engineering task which has ever been attempted by any people anywhere." Dr. Draper, the 'father of inertial guidance,' will give us a progress report on these activities at M.I.T." Again your secretary had an envelope in his pocket and here are the brief notes on the back of this envelope: "Like every previous project, this one has been continually on the edge of castastrophe. A razor's edge divides disaster from success." Stark also mentioned that the last issue of the National Geographic Magazine tells about the Apollo Project but not the guidance system. Stark didn't tell us much about it either since it is obviously highly classified. Some things he could say were that there could be no chance to miss and that it must be done with minimum fuel. The pilot's main job will be to communicate with the computer but he can also ask the earth through a shorthand type of code. Stark's prediction: the next request will be a visit to Mars and Venus. The relaxed way in which Stark describes this effort does not convey its magnitude, but he did mention that there are currently 1,800 people working in the Instrumentation Laboratory. I have asked a friend to save the National Geographic so I can read more about it. . . . Here's a letter from classmate **Al Gates,** who claims to be an avid reader of '26 notes and was inspired by **Dave Shepard**'s example a couple of months ago to clip the enclosed item re. a one-time roommate. "I hasten to pass it on now before it gets down to the bottom of the pile again, Sincerely, Albert M. Gates." The clipping from the Philadelphia Inquirer states "Dr. **Edwin L. Lame,** chief of radiology, has been elected president of the Presbyterian Hospital Medical Staff. Dr. Lame has been a member of the medical staff for 16 years." Many thanks Al for the clipping and congratulations to Ed Lame for this new assignment and for his success in the medical profession. With this item of good news we will say cheerio once again until the June issue. We hope that many of you are planning to be around for Alumni Day.—**George W. Smith,** Secretary, E. I. duPont de Nemours and Company, 140 Federal Street, Boston, Mass.

'27

I have a letter from **Erik Hofman,** which starts out by giving some information helpful in getting a good address for **Wally Kwauk.** Erik saw Wally in 1962, and he was then living in Hong Kong at the "Estoril Court." Erik then goes on to say: "I have to retire in a few weeks. (Jersey has a 60-year compulsory retirement for overseas personnel). Tibby and I are going around South America, leaving Acapulco in mid-March on a Norwegian freighter. It's a trip both of us have wanted to take for many years. Then we are going to drive around Europe. Where we will settle, on the shore somewhere we hope, has not been decided. So I'm not giving up our apartment here until we know. This address 'Apartado 24362, Mexico 7 D.F., Mexico' will be good for a long time." Send us a postcard, Erik. . . . And speaking of tours, **Ed Damon** checks in from Singapore saying that he likes it. . . . After the operation referred to last month, **Jim Lyles** is now recuperating nicely at home. . . . **Parry Moon**—also see last month's class notes—has retired from his position as associate professor in electrical engineering at M.I.T. . . . **Glenn Jackson** set up the Nashua Finishing Company at Amherst, N.H., about eight years ago. Now, we are sorry to hear from Glenn: "No news other than we ceased operations in December, 1963, and are now liquidating machinery, real estate, and the business. Several factors caused us to go out of the cotton dress goods printing business: foreign imports, loss of export markets, and the big swing to man-made fibers for which we are not geared." . . . We have a new address for **Richard Cutts, Jr.** at Apt. 7D, 301 East 48th Street, New York 10017. He moved there from Schenectady.—**J. S. Harris,** Secretary, Mason's Island, Mystic, Conn.

'28

In the October, 1963, issue of International Science and Technology we note a two-page article by **John Stack.** Accompanying a photograph of John is a short business biography. To quote: "The Supersonic Transport. Why Mach 3? Or, for that matter, why Mach 2? Wouldn't it make more sense to set a less ambitious goal? The answer is emphatically no. The reasons are half aerodynamic, half economic. He doesn't fly supersonic aircraft (his license reads, 'private, single-engine, land') but John Stack designs them. He also rides in them occasionally as part of his activities as vice-president and director of engineering at Republic Aviation. Stack is a forceful, colorful, controversial character who, as one of his colleagues puts it, 'can always be relied on to stir the pot.' He has been stirring the high-speed-aerodynamics pot for over 30 years, most of which time was spent with the old NACA (now NASA) organization where, as director of aeronautical research, he was responsible for the design of many supersonic aircraft. Stack is a two-time recipient of aviation's coveted Collier Trophy—once for his contribution to the X-1, once for the design of the first transonic wind tunnel."

Jim Donovan recently turned over to your secretary a letter dated March 3, 1964, that he received from **Charles Richheimer,** 3694 Hedrick Street, Jacksonville, Fla. 32205. "I'm typing this in the hopes that it turns out to be more legible than my script, which has come in for some adverse criticism of late. Your ears and **Ralph Jope**'s should have burned brightly some three weeks ago, as **A. Pedro Moyano** (Pete) and I talked over old times in Mexico City and got caught up on each other's activities after 1941, which was the last time we saw each other. Booty and I spent two days with Pete, his charming wife, Tutu, and his lovely family (four daughters, one a nun, one married and the mother of a really adorable granddaughter who 'rules the roost' in regal style, and two teen-agers who quite won our hearts) and were completely fascinated by Pete's tales of his activities for the past 20 years.

"Immediately after graduating in 1928, Pete started in heavy construction, in Mexico, with the railroads and later with the Mexican Light and Power Company and a subsidiary of Leonard Construction Company of New York and Chicago. From 1947 to 1956 Pete 'roamed the world' as general superintendent or chief engineer on such well-known projects as Clark Field in the Philippine Islands for the U. S. Air Force; the Naval Air Base at Port Lyautey, French Morocco for the U. S. Navy; and the Spanish-American air base at Torrejon de Ardoz, near Madrid, Spain for the U. S. Air Force. From 1956 to 1960 Pete was representative for Armco International for Central America and Panama. Since 1961, Pete has resettled in (and hopes never to leave again) Mexico City as general manager for Plasticos para Construccion S. A., marketing and distributing THURANE, a Dow Chemical Company insulating material. They hope to expand into other lines or materials allied with the construction industry. After leaving Mexico City and Pete (with a deal all cooked up to be in Boston, together, in 1968), Booty and I went down to Acapulco and had a truly fabulous time. I thought Florida had sailfishing but after Acapulco, I'm not so sure. Four beauties, brought to the boat and released, in four hours, certainly set a record for me. Pete joins Booty and me

in sending our best to you and yours and (please pass this letter along) to Ralph and his family. We always enjoy the 'Christmas Card News' and hope to see you, in person, down this way, real soon."

Don Sturznickle, 6143 Longmont Drive, Houston, Texas 77027, recently sent us a long clipping from the Houston Chronicle, which narrates a very interesting biography of **Bill Hurst,** who, as we all know by now, received the Anthony F. Lucas Medal for Achievement, the annual award made by the American Institute of Mining Engineers. The article treats particularly with the early life of Bill with emphasis on his Institute days. We plan to use this biography in a future issue when space permits. In the meanwhile we can quote from the laconic report by Don, which simply says: "Texaco, Inc. transferred my engineering department to Houston, Texas, July 1, 1960, so here we are. Nothing new in my personal life. I hope to come back East in 1964 for the New York World's Fair." . . . An equally effusive reunion report from **Roger W. Haven,** 37 High Rock Road, Wayland, Mass., states, "Joined Laboratory for Electronics 1962. Married, one son. Recreation includes restoration of antique banjo clocks, ice boating, weathervanes, home workshop, boating, home and garden. Hope some day to travel."—**Hermon S. Swartz,** Secretary, Construction Publishing Company, Inc., 27 Muzzey Street, Lexington, Mass.

'30

This month's notes are being written at Crown Point, Tobago, where the **Listers** are basking in the sun and snorkeling at Buecoo Reef. We flew to Trinidad last week. With some difficulty I persuaded Marion to leave the shops of Port-of-Spain long enough to visit the asphalt lake. It seemed to me worth a look, although I concede that reasonable men (or women) might differ on this issue. Martinique and Barbados are on the schedule ahead. . . . A note from **Ed Kingsley** indicates that he has joined the ranks of the self-employed. A little over a year ago, he established the New England Contract Carpet Company. He writes that it had been "a very interesting experience, sometimes frustrating, sometimes gratifying, but over all I have done quite well." The Kingsleys are still living in Wellesley Hills. Their daughter is married, living in Irvington, N.Y., and has one child. Their son is a freshman at Gettysburg. . . . From Sarnia, Ontario, **Ralph Rowzee** reports that Polymer Corporation, of which he is a managing director, now has European plants at Strasbourg and Antwerp, as well as an interest in an synthetic rubber plant nearing completion in South Africa. Ralph does a great deal of traveling, not only to the European plants but also to South Africa, Australia and the Orient. The Rowzees have three daughters: Susan, who is married and has one son; Betsy, who is in her fourth year at McGill; and Nancy, who is in Grade 12. . . . A brief note from **Ted Riehl** says that he is still working for Goodyear after 33 years. The Riehl's son John graduated from Princeton and is now doing graduate work at M.I.T. Younger son Charles is at Colgate. . . . **Jim Merrill,** Goodyear's assistant director of research, has also completed 33 years with the company but has decided to call it quits in order to "pursue his lifelong interest in conservation." Jim has 20 acres of farm and woodland east of Canton, Ohio, on which he will experiment with scientific conservation practices.

As usual the February TAPPI meeting brought a number of our classmates to town. The M.I.T. luncheon at the Americana was most enjoyable and provided an occasion for **Fred Holt, Bob McCarron** and me to "re-vue" for the first time since we jointly wrote a bachelor's thesis in the spring of 1930. Fred is vice-president and technical director of Brown-Bridge Mills in Troy, Ohio. He has a daughter who is now attending Dana Hall. Bob is technical service manager of Morningstar, Paisley, which was recently taken over by Charles Pfizer. He has a married daughter, two sons and five grandchildren. His older son is a physicist with Sylvania and his younger son is at University of Maine. Bob has been collecting old documents and prints for a number of years and had a part of his collection at the meeting. Items of particular interest were a colorful and extensive collection of Nineteenth Century advertising cards, and mid-Nineteenth Century issues of the Saturday Evening Post and New York Tribune. About a year ago he presented to the Dard Hunter Museum of the Institute of Paper Chemistry in Appleton, Wis., a copy of Lavoisne's "Atlas" (1821), the title page of which states that it was printed on "J & T Gilpin's machine paper." The "Atlas" is believed to be the first major book printed on machine-made paper produced in this country. . . . Other classmates attending the TAPPI meeting included **Tony Savina, Ralph Peters** and **Howie Gardner.** . . . We have at hand notices that two more of our classmates have passed away: **Jim Bowen** in December and **Eleanor Brown Jette** in January. Unfortunately, no details are available.—**Gordon K. Lister,** Secretary, 530 Fifth Avenue, New York 36, N.Y.; Assistant Secretaries: **Charles T. Abbott,** 26 Richard Road, Lexington 73, Mass.; **Louise Hall,** Box 6636, College Station, Durham, N.C.; **Ralph W. Peters,** 16 Whitestone Lane, Rochester 18, N.Y.

'31

News reports of the rioting which broke out in the Panama Canal zone last January spoke highly of Major General **Robert J. Fleming, Jr.,** the Governor of the Zone, who has been described by those who have known him well over the years as: "A first-rate engineer and a very capable army officer." They mentioned that Governor Fleming feels strongly about the issue which caused the violence. Fifteen months before the trouble arose, he and President Roberto F. Chiari of Panama hoisted their respective flags in Balboa, C. Z., side by side, and the governor expressed his satisfaction. While chief of the Army Engineers in the New England area, headquartered in Boston, General Fleming became well-known in Connecticut for his flood relief work. "He impressed people, as a kind, optimistic man who knew his job." . . . Congratulations to **J. K. Jamieson,** who has become president of Humble Oil and Refining Company. He joined the Humble board of directors in 1961 and has been executive vice-president of the company since January 1, 1962. Prior to June, 1961, he was president and director of International Petroleum Company, another Jersey Standard affiliate. . . . Congratulations are also in order for **Earl E. Langeland** of New York, who has been elected president and chief executive officer of American Maize-Products Company of Hammond, Ind., the sixth president in the company's 56 years of existence. He joined the company 23 years ago as a chemist in its research laboratories in Hammond and since then has served in all levels of management in the operating divisions. He is a trustee of the Corn Industries Research Foundation, Washington, and holds a seat on the Chicago Board of Trade.

We are also happy to congratulate **Claude F. Machen,** who has succeeded E. H. Eacker as president of Boston Gas Company. Claude joined the company in 1936 as superintendent of the Charlestown Electric Division, was named assistant to the president in 1954, vice-president in 1959, and a director in 1960. During recent years he has been responsible for administrative services in the company. . . . We have just learned that Dr. **D. B. Sinclair,** formerly executive vice-president of General Radio Company, was elected president at a meeting of the directors on October 18, 1963. He joined General Radio in 1936 and soon became chief engineer. In 1955 he was appointed vice-president for engineering and in 1956 was elected a director. For the past two years he has held the post of executive vice-president and technical director. Congratulations to you, too, Don! By the way, did you stick with the trumpet? My daughter's instrument at the moment is the french horn. . . . From an article in Timber Producer, we have learned that **John E. Spalding,** who has been manager of manufacturing operations of Nekoosa-Edwards Paper Company since April 1, 1963, has been named vice-president of manufacturing. He will be responsible for all manufacturing, engineering, and power activities of the mills of this leading producer of business, printing, and converting papers in Port Edwards and Nekoosa, Wis., and Potsdam, N.Y. Before joining Nekoosa-Edwards last spring, he was plant manager of the Hartford City, Ind., mill of Minnesota Mining and Manufacturing Company. Prior to this, he spent 10 years with Marathon Corporation in various capacities, and was in charge of the group which designed and built the Naheola, Ala., mill. After construction was completed, he managed the mill and later was elected vice-president of Marathon

Southern Corporation. Our congratulations, John! . . . From the Chicago Tribune, we learn that Major General **Henry R. Westphalinger** has been appointed executive director of Glenwood School for Boys, Glenwood, Ill., which post he assumed in February of this year. Before his retirement from the army in October, 1962, he commanded the army communications zone in Europe for three years. During World War II, he served under Gen. MacArthur, and helped plan the occupation of Japan.—**Edwin F. Worden,** Secretary, 35 Minute Man Hill, Westport, Conn.; **Gordon A. Speedie,** Assistant Secretary, 90 Falmouth Road, Arlington, Mass.

'33

Another month has passed, and the notes are showing signs of becoming shorter; much shorter, and still we have no personals direct from the producer. I expect that the tempo will pick up a bit now that the March issue has come out, as this issue was the first to carry the new by-line. I sure hope so. Digesting the press releases is not too easy a job and, it is little short of cruel to have to leave out so much of this very interesting field of gossip. . . . From the Automotive News comes a long article with the information furnished by **Steve Crick.** The article was on mufflers, one part of the Automobile most generally agreed to be l——, a five letter word meaning not too good. The article was long, interesting, and informative, but, the information is wasted on me because I still find myself covering the first three holes with galvanized sheet metal, and buying a new one when the fourth appears. I will have to take something back about Steve. He seems to know what he is doing, so he must have been listening back 30-odd years ago. I 'know' he did nothing else.

Also via the press, we hear that **Maxwell D. Millard** has been appointed vice-president, sales by U. S. Steel. Max was one of the graduate chaps when we were serving our time at the Institute. . . . Not news, of course, but recognition, comes from the Pennsylvania "Triangle," which presents a "Faculty Profile" of Dr. **Cornelius Weygandt,** who received his master's degree from the Institute in 1933. This profile is a short biographical sketch of a well beloved Penn Alumnus, who is at present, professor, and chairman of the graduate group in electrical engineering. The good doctor is truly a credit to his old school, and we are proud to have had him with us for even a short time. In these days of "electronics," he stands out as top notch. It is unfortunate that we mechanicals have difficulty understanding even the names of the subjects about which he writes, and, as **Goodridge** says, our evident lack of education is quite apparent. . . . Now, we hear of a civil engineer becoming treasurer of a bank, and, it is not too far fetched at that, I find after reading the press release. **Lawrence C. (Larry) LeBeau,** has just been made treasurer of the Keene (N.H.) Savings Bank. This fellow has really been around. He was a banker before going to Bates College. He received a degree from Bates in 1929, cum laude, Phi Beta Kappa et al, and graduated with us as a civil engineer in 1933. Then, he went right back to banking, and has held positions too numerous to mention here. If I ever find out why he had to have the S. B. in civil engineering, I will let you know. Perhaps his case is like my own in one respect. He couldn't find a job so he went back to school. The Keene Sentinel sure gives Larry a great write-up, which appears to be justly deserved. The picture looks not like a banker looks!

Business is picking up a little! I have a personal from our good Treasurer, **George Stoll.** I won't bore you men with the first page of George's letter, as it is all of financial wizardry and manipulation of class funds. Please write George for details. However, he has appointed **Clarence Westaway** assistant treasurer, after trying to get **Lou Flanders** into the act. Westy, says Georgie, is still a bachelor and works for Ingersoll-Rand Company. Now, I saw Westy last June and he showed no signs of any marital change; he allowed, after seeing the married men at the reunion, that he guessed he would make no change, at least in the next 20 years. . . . Now for Lou Flanders. By golly, you may always count on old Lou! He is always right there, when you need him. Of course, he always says 'no,' but it is comforting to know that someone is always near who always says 'no.' What a character! George lives in a community where most of his friends are Dartmouth men, except for one Dick Baltzer '31. Probably he has about the same experience that I have in Exeter, again surrounded by men from the same place. Once in a while some one of them will reaffirm my having graduated from M.I.T., and soon after, I catch him looking at me as though I had escaped from someplace, maybe the Zoo. I do believe that I will give George a little more space, as George is a grandfather. He and 'Mother' have two children; a son who attended University of Massachusetts, and a daughter, who attended Colby. Both have children, making George a confirmed member of our Grandfathers' Club. George's son-in-law, it appears, is a Reserve Marine pilot, presently studying law. Gosh, I never supposed it was necessary to have one of those in the family, when it is known that all attorney's fees are deductible. On the other hand, I do not know what George has been caught at, either.

Today's mail brings important information, via Goodridge, that **David Beach Smith** has accepted an appointment to the Faculty of the Moore School, University of Pennsylvania. Dave, until recently, has been vice-president of the Philco Corporation, and director of research. This is the kind of class news that I really enjoy recording when I think back to some others who have done the same thing, at the Institute—Professors Jackson, Moreland, Hunsaker, and many, many others. I have always considered that these men are really big men; willing to accept a major drop in income, in order to do something for others. I say to Dave, sincere best wishes and congratulations from all of us. More power to you, Dave! Please note, men, that this is a personal.

Now, last but surely not least, President **Goodridge** asks me to announce that an informal meeting of the class will be held in New London, Conn., Saturday and Sunday before Alumni Day, June 13 and 14, 1964. This is mostly a sectional meeting of those men who live in or near the Boston and New York areas. Ed is quite anxious to start these annual informal meetings right off; I am told he wishes to do the same thing in other parts of the country, if it appears to be popular. This meeting is for classmates and wives (and children), who can reach New London, Conn., in a few hours drive. The meeting is to be held at The Griswold, Eastern Point, New London, and men and wives will attend from New Hampshire, Massachusetts, New York, New Jersey, and Connecticut. But this get-together is not limited to men who live in the two metropolitan areas. We hope, also, to gather in those classmates who are on their way to attend Alumni Day the following Monday, and who might well come from much longer distances. The Griswold has been used by many other classes for their five-year reunions, and is said to be an ideal spot. For those who do not wish to spend all the time in the cocktail lounge, golf, tennis, swimming, lawn sports (in daylight only), will provide diversion. No business except in small groups, and just about all fun, says Goodridge. Let's get behind this first effort of our new president; he rates consideration, for sure. Ed asks that you write or phone him, and he will make reservations for you at the Griswold. You may make your own if you please; if so, send him a copy of your letter. Ed's address is 41 East 42nd Street, New York 17, N. Y. Let Ed hear from you. Thanks in advance for those personal news items you are about to send in.—**Warren Henderson,** Secretary, Fort Rock Farm, Exeter, N. H.

'34

Without measurable dissent from any quarter, it has now been agreed by the present class secretaries, the class nominating committee and other interested parties that the idea of sharing the secretarial burdens among four scribes and the idea of rotating secretarial duties each five years among willing class members are both very worthy and deserve continued support. Consequently, at the business meeting to be held next month during the reunion, the nominating committee will present a slate of class officer candidates including four new names chosen geographically to help gather class news from all sections of the country. The secretarial task can provide inconveniences and may seem to be completely thankless. To those who may be asked to undertake this responsibility, either this year or in any future term, I would like to say that there are moments of reward. It even happens that classmates otherwise clouded in oblivion take pen in hand

(bless them) and write you a letter. And even a secretary who has theretofore been quite removed from the doings of the Institute and associations with the class will find heartwarming experiences from people, reminiscences and an increased sense of relationship with the Institute and many of your former friends. —**G. K. Crosby,** Secretary, 44 Deepwood Road, Darien, Conn.; **H. E. Thayer,** Secretary, 415 West Jackson Road, Webster Groves 19, Mo.; **M. S. Stevens,** Secretary, 9 Glenfield Road, Barrington, R.I.; **J. P. Eder,** Secretary, 1 Lockwood Road, Riverside, Conn.

'35

A few months ago I gave you **Mike Kelakos'** address as American Embassy, APO 794, New York and suggested that if he read the notes a letter of explanation would be appreciated. He does, and here is his most interesting and welcome letter: "Your appeal to write touched me to the core and pulled me out of my usual lethargy so far as correspondence is concerned. My present post is Rome, Italy where I am assigned as the Embassy's Deputy Scientific Attaché. Perhaps a short explanation of how I came to this kind of an assignment might be of some help. To begin at the beginning, after graduation in 1935, I went to work for Mathieson Alkali Works in Niagara Falls, N.Y., with which company I stayed until January, 1942, when I entered on active duty with the Army. After the end of hostilities in Germany, I joined forces with the late Dr. Alfred Newman, Dean of Technology of C.C.N.Y., as his deputy in Berlin and participated in the implementation of the Potsdam Agreement so far as the chemical industry was concerned.

"One of our functions in OMGUS (Office of Military Government U.S.) was to determine what chemical plants were designated to be removed from Germany as reparations. In May, 1946, I returned home for discharge and returned to Brussels, Belgium, as a member of the international secretariat of the 17-nation Inter-Allied Reparation Agency, presumably to take over the Chemicals Division. Actually, since the number of chemical plants for reparation was not impressive, I was transferred back to Berlin to serve as deputy chief of the agency's Berlin Mission. The next 18 months in Berlin proved most interesting since I shared a home with my chief, a retired British general, and the number three man on the team, a retired French naval captain who during the war had been in charge of all the French Commandos in Northern France. In January, 1948, I was transferred to the headquarters of the Inter-Allied Reparations Agency in Brussels to take over one of the two operating divisions of the agency, the Programming Division. This division was responsible for establishing the secretariat's recommendations to the General Assembly on the allocation of all industrial capital equipment made available as reparations from Germany. It was a most interesting assignment since it gave me a wonderful opportunity to work closely with professionals representing at least 12 different nationalities. A short stint as special assistant to the secretary-general of the agency and I returned to the States in 1951 to become associated with the Department of State in Washington as the Economic Development Officer in the Office of South Asian Affairs.

"I spent over three years with this office during which period I became intimately involved with the programs of technical assistance and economic development of India, Pakistan, Afghanistan, Ceylon and Nepal. In September, 1953, I married Theresa Plakias of Milton, Mass. In June, 1954, we were assigned to Athens, Greece, where I was in charge of investigations in Greece for the Refugee Relief Program. This assignment afforded me a God-sent opportunity to see this beautiful country and its many lovely islands. After 18 months in Greece, we were transferred to Stuttgart, Germany, where I assumed charge for the investigations in Germany for the Refugee Relief Program. It was at this time that I became a career officer in our Foreign Service. We returned to Washington in January, 1957, where I was assigned as the officer-in-charge of Economic Affairs in the Office of International Economic and Social Affairs. The work involved responsibility in the Department of State for the economic activities of the United Nations and the Specialized agencies. Specifically, I was concerned with the four Regional Economic Commissions (ECE, Geneva; ECAFE, Bangkok; ECLA, Santiago, Chile; and ECA, Addis Ababa), Food and Agriculture Organization, World Meteorological Organization, International Telecommunications Union, International Civil Aviation Organization, Universal Postal Union and the Intergovernmental Maritime Consultative Organization. In addition, I followed the activities of the Economic and Social Council of the United Nations as well as the Economic and Financial Committee of the UN. I spent six and a half years in UN work, and in June, 1961, I was assigned to our Embassy in Paris to serve as the Deputy Permanent Representative of the United States to the United Nations Educational, Scientific and Cultural Organization (UNESCO).

"We spent two most enjoyable years in Paris and were reluctant to leave this City of Cities. But as happens in the Foreign Service, we were transferred to the Embassy in Rome to serve in my present capacity as Science Officer. I spent about 12 weeks in Washington trying to absorb some Italian—with not too much success, I might add—and then to Italy where we arrived only two months ago. We are blessed with two youngsters, George (7 years of age and Eleni (6 years of age). We are gradually getting settled in this Imperial City and trust that if you or other classmates have occasion to visit here that you will look us up. We should remain here for at least two years.

"As you may know, the Science Attaché Program of the Department of State was started only a few years ago. Professor Walt Whitman was for a time our Science Adviser to the Secretary and I had many opportunities to see him during my assignment in Washington. Our program is expanding, although at the moment there are but a very few career Foreign Service officers connected with the program, normally as deputies. Since we prefer that the scientific attachés be active scientists or engineers, we are hopeful that more FSO's with a scientific or technological background will be brought into the program in the future. This in short is my life history since leaving Tech." Many thanks, Mike, for taking the time to write. You certainly have had an interesting life. I am sure that any of our classmates who get to Rome in the next two years will be looking you up. You know, it's a nice feeling to know that some '35ers read these notes because I surely begin to wonder sometimes.

A rather large problem loomed up for our 30th Reunion Chairman **Bob Forster** and unfortunately the only solution was for him to resign from this top post, or at least, find a co-chairman. In either case, we may not see him that weekend for very long. Take heed, all of you who married child brides—because Bob's wife, Carolyn, is celebrating her 25th at Vassar that same weekend. . . . **Art Marquardt's** wife, Elna, is reported to be very busy sewing Art's shirt buttons back on. Arthur, Jr., star basketball player for Dedham High School, has been catching headlines in the Boston papers with his wizardry on the courts, in the Tech Tourney, no less. . . . **Utley W. Smith,** Course XV, is now living at the Devon Park Apartments, Devon, Pa. . . . **Eugene P. Newell,** Course IX-B, has moved from Richmond to 160 Concord Street, Nashua, N.H . . . . **Franklin F. Lovering,** Course III, has shifted from Bartlesville, Okla., to c/o Phillips Petroleum Company, 1300 Security Life Building, Denver. . . . Your secretary and family had their annual skiing weekend over March 1 and all came back whole. This time it was at Sunapee where the snow was the best of the season. We were lucky, too, because the next week's rain and warm sun just about finished things. . . . If your last name begins with a "B", "C", "E", or "R", followed by an "E", "O", "D" or "I", then it's your turn to write a letter.—**Allan Q. Mowatt,** Secretary, 61 Beaumont Avenue, Newtonville, 60, Mass.; Regional Secretaries, **Edward C. Edgar,** Kerry Lane, Chappaqua, N.Y.; **Hal L. Bemis,** 510 Avonwood Road, Haverford, Pa.; **Edward J. Collins,** 904 Merchandise Mart, Chicago, 54, Ill.; and **Gerald C. Rich,** 105 Pasatiempo Drive, Santa Cruz, Calif.

'36

Sometimes a little detective work is needed when a batch of news clippings comes to your secretary from the Alumni Office. This time however, I cannot fill in the missing details: the date of the meeting of the Seattle section of the I.E.E.E. at which the speaker was one of our class graduate members, **John M. Fluke.** He

heads his own company which he moved to Seattle from Connecticut in 1952. The John Fluke Manufacturing Company is engaged in the design and manufacture of differential voltameters, DC power supplies and high accuracy measuring devices. . . . **John Ayer** represented the Institute at the Centennial Convocation of the University of Denver on March 5. It was a long birthday celebration since my husband George was a Centennial lecturer at the time of the opening convocation last October. . . . **Hamilton Migel,** a vice-president of the Magnaflux Corporation in Chicago, is in London for an extended period setting up a subsidiary company. He and his wife are expected back in this country in July. The stay abroad necessitated his resignation as a trustee of Northfield Village, a position he had held since 1957. . . . Colonel **Al Bagnulo** should now be addressed care of NASA, Kennedy Space Center, Cocoa Beach, Fla.; **Bill Boland** at P.O. Box 125, Station A, Champaign, Ill. 61824; **Harry Easton** at Greenwich, Conn., on Burning Tree Road, instead of White Plains. **Charles F. Kennedy** is at 1021 East Water Street, Elmira, N.Y.; **Malcolm Seymour,** R.F.D., Pemaquid, Maine; and **Edward Targonski** at 206 Greenbriar Road, Muncie, Ind. Your secretary is still at the same stand although during May I expect to visit my daughter in Seattle, spend 10 days in San Francisco at the General Assembly of the Unitarian Universalist Association and associated meetings, and then visit numerous relatives and friends in southern California.—**Alice H. Kimball,** Secretary, 20 Everett Avenue, Winchester, Mass. 01890.

'37

At the recent Foothill Section meeting, Pomona, Calif., **James B. Henderson,** supervising mechanical engineer, Southern California Edison Company, spoke on the subject of "The San Onofre Nuclear Generating Station." The Southern California Edison Company is planning to build the $82 million atomic power plant near San Clemente on a corner of the Camp Pendleton Marine Base. Henderson has been associated with the San Onofre project since its earliest inception and is now project engineer charged with the responsibility for supervision of design, construction, and start-up of the 395,000-kw nuclear plant. After a varied career in industry, he joined S.C.E. in 1949 as a construction engineer. His assignments with Edison have covered design and construction of steam stations, pipelines, transmission lines, and substations. . . . **James D. McLean** has resigned as president and chairman of the board of Highway Trailer Industries, Inc., of Chicago, to form a development firm in Los Angeles dealing with general management, product development, marketing and engineering problems in the electronics, aerospace and transportation industries. McLean will be president of the new organization, McLean and Company. He served as president of General Dynamics-Electronics, president of Hoffman Laboratories, Inc., and vice-president and general manager of Philco's Government and Industrial Division. He is a director of Struthers Scientific and International Corporation of New York.

An excerpt from the Boston Globe reads: **"Robert H. Thorson** of Medford has been elected vice-president of the National Established Repair, Service and Improvement Contractors Association. Known as NERSICA, the association is the national organization of home improvement and remodeling contractors. Thorson is president and treasurer of Thor Roofing Company in Medford. He is first vice-president of the General Home Improvement Contractors Association in the Boston area." . . . Dr. **Charles E. Reed,** Vice-president and general manager of the Chemical and Metallurgical Division of General Electric, recently spoke before the 64th annual meeting of the Findlay (Ohio) Area Chamber of Commerce. He was also awarded the second annual Fort Findlay Award as a distinguished former resident of the community. Dr. Reed is presently living in Bridgeport, Conn. He served M.I.T. from 1937 to 1942, when he became a research associate at G.E.'s research laboratory. Dr. Reed was a pioneer in the field of colicone development and manufacturing and holds several patents in the field, he has been lecturer of the American Society for Testing Materials; and is the co-author of a text "Applied Mathematics in Chemical Engineering." Earlier this year, Dr. Reed was honored by Case Institute of Technology when he was named one of the first recipients of the President's Achievement Award.

Alfred A. Roetzer has been named new general manager of the Wagner Bag Division of St. Regis Paper Company with headquarters in Salt Lake City, Utah. He was formerly manager, engineering services, in the packaging engineering department of the company's bag division, located at West Nyack, N.Y. Al joined St. Regis in 1947 as engineering manager for the company's former engineering and machine division in the Chicago district. . . . **George R. Weppler** was elected president of Harvey Hubbell, Inc., Bridgeport, Conn. Elected executive vice-president in 1959, George joined Harvey Hubbell, Inc., manufacturers of electrical wiring devices for commercial, industrial and residential use, in March, 1955. Prior to joining Hubbell, he was associated with the L. E. Waterman Company in New York City and Seymour, Conn.; Metal and Thermit Corporation, New York City; and Johnson and Johnson, New Brunswick, N.J. George is retiring president of the Bridgeport Manufacturers Association and chairman of its advisory committee; a director of the City Trust Company of Bridgeport, the Park City Hospital and the Junior Achievement Association of Western Connecticut; and is also on the advisory council of the Bridgeport Engineering Institute. He is a member of the National Electrical Manufacturers Association and the American Ordnance Association. George lives in Westport, Conn., with his wife and five children.

Duane O. Wood has been elected president of Lockheed Aircraft Service and also elected a corporate vice-president. Wood joined Lockheed in 1940 as an industrial engineer. He was named vice-president-operations of Lockheed Aircraft Service in 1956. He has served as vice-president-engineering and research of this division since 1958. . . . From the Bell System Technical Journal: **"Kenneth Bullington,** B.S., 1936, University of New Mexico; M.S., 1937, M.I.T.; Bell Telephone Laboratories, 1937. Mr. Bullington has worked on transmission engineering problems on wire, radio and submarine cable systems. He is now head, Transmission Projects, Engineering Department. In 1956 he received the Morris Liebmann Memorial Prize of the Institute of Radio Engineers and the Franklin Institute's Stuart Ballantine Medal for contributions in tropospheric transmission and its application to practical communications systems. He is a fellow, I.E.E.E.; member, Phi Kappa Phi, Sigma Tau and Kappa Mu Epsilon."—**Robert H. Thorson,** Secretary, 506 Riverside Avenue, Medford, Mass.; **S. Curtis Powell,** Assistant Secretary, Room 5-325, M.I.T., Cambridge, Mass.; **Jerome Salny,** Assistant Secretary, Egbert Hill, Morristown, N.J.

'38

President **Jack Bethel** shares with us some of his world-wide correspondence and cross-country traveling: "I received a Christmas card and just recently a letter from **Milt Wallace,** who is chief, Engineer Branch of the Joint U.S. Military Advisory Group to Thailand. Quoting from the card, 'Left Boston after the reunion which we enjoyed very much and arrived here in Bangkok on 1 July. Have had a fine time enjoying the country and its people. Have seen **Charoen Pattebongse** and **Dean Voodiguhla.** Charoen and his wife had us over for several fine Thai and Chinese dinners. Dean Voody is Dean at the SEATO Graduate School of Engineering.' The letter which was dated January 29 says: 'Good news about one of our classmates—**Urathai Voodiguhla** (who at home spells his name Uthai Vuthikul). A recent newspaper article announced his appointment as Director-General of the State Highways Department. This is one of the most important engineering positions in Thailand. The Highway Department is similar in functions to one of our State Highway Departments, but is national in scope. Everything else is about the same here. We are now in the middle of the cold season. Temperatures range from 80 degrees at night to 96 degrees in the day—a little different from January in Boston. I have been kept busy visiting all parts of the country, which I enjoy very much.' "

Jack continues with other newsy notes: "I had an opportunity to talk with **Jim Maguire** over the phone the other day. He is now well settled in his position as assistant director of engineering, Inorganic Engineering Department, at Monsanto Chemical's main office in St. Louis, Mo.

Jim reports that Marge and he like the St. Louis area. You may remember he was transferred there from Boston just before the reunion. He also reports that he has spent the intervening months painting and redecorating the inside of a house that they bought last spring. Last fall when I was in Seattle, I tried to get in touch with **Gus Rossano** who is, as you know, Professor Rossano at the University of Washington. Apparently Gus has an easy teaching schedule and devotes quite a bit of time to consulting in the field of air pollution. He is one of the recognized experts in this growing field. In any case I never did catch up with him nor did he with me, but I did get up to the University to see his office and the school where he teaches."

From our own correspondence we have a tip on **Ira Lohman,** who has been transferred from Chappaqua to I.B.M.'s San Jose office. Ira, Louise, and the children (and the airplane?) were moving to California in late February. . . . **Jack Downs,** who took his S.M. in civil engineering with us, has been elected a vice-president of the Great Lakes Dredge and Dock Company, and manager of their Chicago Division. Jack, Ruth, and their five children have made their home in Downers Grove, Ill., for many years. He has directed various construction projects for Great Lakes around the country. . . . Kirloskar Brothers, we reported a couple of months ago, recently celebrated 50 years of industrial progress. Since then the brochure **Ravi Kirloskar** sent me has returned from my son's school exhibit, and here are a few of the high points. Ravi's father, Laxmanrao, founded the town of Kirloskarvadi in an arid wasteland about 100 miles S.E. of Bombay. Previously he and his brother started the company in Belgium, manufacturing iron and steel farm tools to replace the centuries-old wooden implements—first a chaff-cutter for converting more vegetation into animal food, and then the first iron plows in India! Zoning regulations in 1910 forced the factory to move, and Kirloskarvadi was established. Planned from the beginning as an organized community with advanced living standards, Kirloskarvadi is now an immaculately clean industrial township of about 2,000, that is visited by many planners from India and neighboring countries. Kirloskarvadi and its satellite community of 25 villages has become an example of rural industry, adding industrial capacity and increasing national product while permitting its employees to remain on the land and even to remain self-sufficient by part-time farming. The villagers' enterprise has converted the wasteland into fertile, profitable farmland. The company sponsors education, medical care, and financial integrity; it encourages recreation, culture, caste and religious equality, and self-respect.

In 1934 as we arrived in Cambridge, Kirloskar Brothers had reached an important milestone; it was making a number of hand and power agricultural implements, having added irrigation machinery, surgarcane crushers, and threshing equipment to the original chaff-cutters and plows. In all these areas it had not only to make equipment but teach the farmers how to use it, and how to diversify and become more efficient. It was at this time just starting into the manufacture of diesel engines, looms, lathes, and large pumps—adding an industrial market to its initial agricultural products. Since then the capitalization has increased ten-fold, production 20-fold, and five subsidiaries have been formed. These additional ventures in Mysore, Bangalore, Kirkee, and Poona, include four plants formed for the production of machine tools, electric motors, diesel engines, and pneumatic tools, plus a fifth, which is a publishing house! Ravi is chief executive officer of Kirloskar Electric Company, Ltd. at Bangalore. The integrated company is India's largest manufacturer of pumps, and a major factor in its economy. It is now in the early stages of its third pioneering program: first iron plows, then pumps, and now heavy machine tools. One of India's problems is the revitalization of its village economy and the infusion of hope, enterprise, and objectives. The whole operation of Kirloskar Brothers at Kirloskarvadi and at its subsidiary plants has been a startling example of how sound technology and competent management can catalyze the self-advancement of hundreds of communities! . . . We are sorry to note the death of **Bronald J. Vasalle,** in June, 1963, although we have just now learned the fact. Bronald was manufacturing engineer for Clarostat Manufacturing Company Inc. in Dover, N.H. He is survived by his wife Helen, and four children.—**Frederick J. Kolb, Jr.,** Secretary, 211 Oakridge Drive, Rochester 12, N.Y.

'39

Twenty-fifth Reunion news as of this writing (March 12) well fits the excellent reputation of '39: preliminary registrations indicate that more, '39ers will be attending our 25th Reunion than any other Tech class so far! According to "well informed sources," the 375 probable registrants—alumni, wives, and children—as of March 9, even before the final mailing, is a number well ahead of previous classes at comparable periods. By the time you read this column, you'll have received full details of the fine program being put together by **George Beesley** and his committee of Casselman, Kaswell, Danenberg, Grant, Rugo, Saunders, Scully, Sheinkopf, and White. Two highlights, for instance: an old-fashioned clambake, complete with seaweed, at the Essex Club, and a full program for youngsters supervised and chaperoned by M.I.T. Coach Jack Barry and a crew of summer camp counsellors. If any laggards haven't gotten the band-wagon flavor of the reunion by now, better get busy quickly. **Seymour Sheinkopf** is handling registrations. Mail is being received at his home, 205 Wolcott Road, Chestnut Hill, 02167. Or you can phone him during business hours at Reliable Hardware Company, Mattapan, telephone CY-8-9300, Area Code 617.

Ralph S. Woollett, IX-A, specializes in electroacoustics at the U.S. Navy Underwater Sound Laboratory, New London, Conn., where he has been located since 1947. He is head of the Applied Research Branch of the Sonar Transducer Division. Ralph is a member of the Acoustical Society of America, and chairman of Subcommittee 14.4 (Magnetostriction) of the I.E.E.E. Standards Committee on piezoelectric crystals. He has followed up on his S.B. degree by getting the M.S. from the University of Connecticut, Storrs, where he is continuing his graduate studies. . . . In the February notes, a paragraph noted that **Wesley A. Kuhrt,** XVI, had been promoted to associate director of research at United Aircraft Corporation, in Hartford, Conn. Now, a subsequent announcement from UAC states that Wes has been named as research director, succeeding J. G. Lee, '21, who retired on February 1.

Woodson W. Baldwin, XV, has been named senior staff engineer, at Aerospace Corporation, El Segundo, Calif. Aerospace Corporation, organized in the public interest, provides technical management research and advanced planning for U.S. ballistic missile and space systems, principally for Air Force Space Systems and Ballistic Systems Division. Woody joined Aerospace in 1962, and was previously head of project planning and control in the Engineering Division. . . . A short item from the First National Bank of Boston announces that **William S. Brewster,** II, President of United Shoe Machinery Corporation, has been elected a director of the First National Bank. . . . **Abraham M. Potter,** X, a partner in Potter's Camera, 708 Flatbush Avenue in Brooklyn, has taken on the sideline of writing a news column "The Industrial Marketplace" for Photo Weekly. Abe was introduced as "one of the nation's best-known and most respected industrial dealers. An engineer by training, (M.I.T.) and former college instructor (Polytechnic Institute of Brooklyn) he heads a firm which supplies photographic and related equipment to industry, science, and education, and also designs and sells specialized equipment of its own."—**Oswald Stewart,** Secretary, P.O. Box 1238, Moravian Station, Bethlehem Pa. 18018

'40

I received a letter from **Joe Greenberg,** Course II, advising that he had changed jobs. Joe was with A. J. Boynton and Company of Chicago, Consulting Engineers, for 19 years, and became vice-president in 1961. Early in 1964 he left Boynton and has joined the Chicago Management Consulting firm of A. T. Kearney and Company as a senior consultant. . . . **Herb Hollomon,** who is Assistant Secretary of Commerce for Science and Technology, was scheduled to give a talk on March 12, before the M.I.T. Club of Washington on the subject of "Science, Technology and National Policy." By a quirk of publication date, the subject matter of his talk cannot be included in these notes. There is a

Will you be in Cambridge for Alumni Day, June 15?

bare possibility the talk might not have been given since Herb was due back in the United States from Holland on the morning of March 12. . . . **Kenneth Fox** has been elected vice-chairman of the Fabric Research Laboratories, Inc. He is in charge of the firm's foreign operations in Europe and the Middle East. Among his recent accomplishments was the development of a long term research and development program sponsored by the Indian Jute Mills Association designed to increase the utilization of Indian jute goods in the United States.

Charles DeMailly is the new president of Plymouth Cordage Company. Charles and wife Eleanore reside in South Dartmouth, Mass. They have three children a married daughter, Claire Prohl, Charles, Jr., a student at New Bedford Institute of Technology, and his twin sister, Marianne, who is a secretary in the President's Office at M.I.T. . . . Charles originally joined United Shoe Machinery after leaving Tech, and was assigned to the J. C. Rhodes and Company plant in New Bedford. Later the Rhodes Company was sold by United Shoe to Plymouth. The favorite hobby of Charles (probably a hangover from days at Tech) is boating, and he is both an avid yachtsman and an enthusiastic small boat racer. . . . **Don Erb** has been elected vice-president of Instron Engineering Corporation, makers of precision materials testing instruments. . . . **Bruce Mackler,** who is professor of pediatrics at the University of Washington School of Medicine, has been honored by Temple University as one of their distinguished alumni. . . . **Jerry McAfee,** who is vice-president and technical advisor of Gulf Oil Company, received the American Petroleum Institute Certificate of Appreciation for contributions to the petroleum industry.—**Alvin Guttag,** Secretary, Cushman, Darby and Cushman, American Security Building, Washington 5, D.C.; **Samuel A. Goldblith,** Assistant Secretary, Department of Food Technology, M.I.T., Cambridge, Mass.

'41

George R. Bises has been named vice-president of Westinghouse Electric International S.A. (Geneva, Switzerland) and regional director for Italy, Greece, Yugoslavia, Israel, Cyprus and Malta. He will make his headquarters at Milan, Italy, 51 Corso Venezia. He was formerly assistant vice-president and European manager of Gibbs and Hill, Inc., Consulting Engineers. . . . During his recent Boston visit, Dr. **Charles W. Sauer** attended the Class '41 Committee meeting at the Faculty Club, where final plans were laid for the Northeastern Area Spring Reunion. Charles is now associated with Douglas Aircraft Company and resides at 1304 Granvia Altonura, Palos Verdes Estates, Calif. He was formerly associated with Arthur D. Little, Inc. of Cambridge. . . . The Spring Reunion of the Northeastern Area was held at the home of **Edward R. Marden,** Weston, Mass., on April 26, under the chairmanship of **Irving Stein.** A report will be published in a later issue.

Professor **Stanley Backer** is co-author of an article entitled "Mechanics of Nonwoven: Orthotropic Behavior" and falling under the general heading of "Relationships Between the Structural Geometry of a Fabric and Its Physical Properties." The article appeared in the Textile Research Journal for October, 1963. It introduces a study conducted at M.I.T. on the properties and the geometric structural arrangement of fibers as they influence the mechanical properties of nonwoven materials. . . . Dr. **Brandon G. Rightmire** is listed in the January 9, 1964, issue of America's Textile Reporter as an authority and co-author of a basic text in fluid mechanics. He is a professor of mechanical engineering at M.I.T. . . . Dr. **Irvin E. Liener** of the Institute of Agriculture, University of Minnesota, conducted a seminar on "The Phytoagglutinins of Legumes and Their Nutritional Significance" on February 24 at M.I.T. . . . **Franklyn W. Phillips,** Director of the Northeastern Office of the NASA, was a member of the committee which established the program and exhibits of the Fourth National Conference on the Peaceful Uses of Space conducted in the latter part of April and early May at John Hancock Hall and the Dorothy Quincy Suite of the John Hancock Mutual Life Insurance Company. This exposition was comparable to NASA's Paris Show of 1962. The exhibits shown were mockups of the manned space vehicles, the base of the Saturn rocket booster, the equipment and clothing designed for the astronauts who will land on and explore the moon. Its aim was to enlighten the New England region on opportunities in the Space Age.

Edward G. Sherburne, Jr., Director of Studies on the Public Understanding of Science, was the author of a report on the 1963 meeting of the British Association for the Advancement of Science, held in Northeast Scotland. The report appeared in the American Association for the Advancement of Science Bulletin for December, 1963. Ed sums up his report with a recommendation for Americans of scientific bent to attend the annual meeting of the British Association which will be held in late August of 1964 in Southampton, England. . . . **David P. Herron** has been made manager of Systems Services, Central Engineering Laboratories, F.M.C. Corporation, Santa Clara, Calif., where he is in charge of systems engineering development services for F.M.C. divisions and commercial customers. After receiving his B.S. and M.S. degrees in chemical engineering from M.I.T., he received an M.B.A. degree from the Harvard University Business school in 1949. He was an assistant professor of chemical engineering at M.I.T. for several years until 1947 and also worked in the General Electric Research Laboratory on the development of silicone products. In 1949, he became vice-president and director of engineering of Atlantic Research Corporation, Alexandria, Va. From 1951 to 1954, he was director of operations analysis for the U.S. Atomic Energy Commission, Washington, D.C. From 1955 to 1962, he was director of engineering for Advanced Technology Laboratories, Mt. View, Calif., a division of American-Standard. He is a member of the Operations Research Society of America, the Institute of Management Sciences, the Society of American Value Engineers, and the American Institute of Chemical Engineers.—**Walter J. Kreske,** Secretary, 53 State Street, Boston 9, Mass.; **Henry Avery,** Assistant Secretary, 169 Mohawk Drive, Pittsburgh, Pa.; **Everett R. Ackerson,** Assistant Secretary, 16 Vernon Street, South Braintree, Mass.

'42

A few weeks ago I had a very nice visit from **Dan Hulett.** Dan is a technical recruiter for Union Carbide Corporation, Chemicals Division, Olefins Division. From 1942 he was involved in production management of olefins and new chemicals at the Union Carbide Charleston plant. In 1963 he became a technical recruiter and covers the area roughly from Athens, Ohio, to Bangor, Maine, down to the Mason-Dixon Line. He finds his new responsibilities most interesting. He is vigorously trying, in the course of his travels, to dispel the exaggerated image of West Virginia that was presented to the nation during the last presidential campaign. He is secretary-treasurer of the M.I.T. Club of Kanawha Valley. He mentioned the names of a number of our classmates who are also with Union Carbide. They include **Mal Anderson,** Traffic and Shipping Management; **Ralph Kelly,** Production Superintendent; **Art Power,** Process Engineering; **Bob McBride,** Area Supervisor of Gas Development; **Dick Little,** Chief Works Engineer for Plant at Institute, West Va.; **Ed Wise,** Chemist in R & D; **Ed Yoder,** Plant Manager in Bombay; **Bob Sollenberger,** Production Superintendent in Puerto Rico.

Dick Feingold, '43, sent me a paragraph from the Philadelphia Evening Bulletin which had this to say about **Monroe Brown** whom it described as one of the city's top 10 bachelors: "Monroe Brown, 43, vice-president and treasurer of Piasecki Aircraft Corporation, 'I wouldn't say I've escaped marriage and I'm really sorry I am a bachelor,' says this bravest of all the top 10. He's looked, yes, but 'I just haven't found the right one.' Monroe is a high-rise apartment dweller, a reserve colonel in the Air Force and a guy with 'hazel eyes and a maid by the same name'." . . . **Tom Crowley** has been appointed managing director, Europe, of Crucible Steel Company. His headquarters are in Vittuone, Italy, a suburb of Milan. He will have the responsibility for co-ordinating the company's sales and production activities on the continent. . . . **George Schwartz** has been elected president and chief executive officer of Magnion, Inc. George left Compo Shoe Machinery Corporation in mid-1963. Magnion manufactures electro-magnets, power supplies, instrumentation for plasma research, and it conducts research in magnetics and cryogenics. . . . Recently in Cleveland I saw

Ken Leghorn, Bob Fay, John Ewing, John Stanitz, all of our class. I think I have brought you up-to-date on these fellows in earlier columns except for **John Stanitz** who is chief scientist of the Electro Mechanical Division of Thompson Ramo Wooldridge. His division works on a wide variety of problems including rocket nozzles for the giant boosters used in our satellite program and secondary power systems for nuclear power plants used in space vehicles.—**Jack Sheetz,** Secretary, Room 7-203, M.I.T.

'43

I received a note in February from Ellen Hosley, wife of **Loring F. (Hap) Hosley,** to wit: "We now have five children, Mary Lu, Loring, Thomas, Elizabeth (born October 6, 1958) and 'Kate' (born August 3, 1963). Each time the last two reunions have been held (the 15th and 20th) we have planned to attend, but things were touch and go with children on the way. This time Hap had a meeting he had to attend—business—on the same date we had hoped to be in Boston. This can't go on forever; maybe next time." . . . Also in February, I received a letter from **James J. Shyne,** who wrote: "At the time of our 15th Class Reunion, I planned to send you a letter bringing you up to date on what has happened to me since graduation. Our 20th Class Reunion has now come and gone and the letter is still unwritten so before the 25th Reunion comes up, and I get any greyer, I am going to sit down and write this long promised letter. It amused me to see in the Reunion Handbook that in answer to the questionnaire sent out to our classmates, I believe I was the top man with seven children. We really threw those statistics out of kilter! We were sorry to have missed the reunion, especially since my wife Eleanor McCarthy, Simmons Class of '43, had hoped to renew some of her college friendships that weekend too. However, conflicting plans made it impossible for us to come. We have four boys and three girls ranging in age from 4 to 15 so there is never a dull moment.

"I embarked in January of 1963, on a very interesting business venture as president of my own company. As a hobby several years previous I became interested in the properties of single crystal fibers, commonly known as "whiskers." These materials are free from the structural defects generally found in materials and as a result have strengths of atom-to-atom attractive forces (several million pounds per square inch) as well as unusual optical and magnetic properties. With the financial backing of the Rockefeller Brothers Associates, a venture capital organization, Thermokinetic Fibers, Inc., 136 Washington Avenue, Nutley, N.J., was formally incorporated in 1962. We are the first organization of its kind to be producing commercially single-crystal whiskers. Our pilot plant is presently producing sapphire and silicon carbide crystal fibers. We have been selling the material to companies in the aerospace, electronics, and plastics fields. We feel that whiskers will do for the structural field what the transistor has done for the electronics field.

"We have been marketing the sapphire and silicon carbide whiskers since October and have been getting a very enthusiastic response from the plastics, metals and ceramics people; and moreover, our investors are very pleased with our progress. Naturally, I am too. I have put in a most rewarding year. It is very exciting to see a new idea become a reality. . . . Although I have been unable to attend the reunions, I have been an active member of the M.I.T. Club of Northern New Jersey. I have served as secretary of the club, assistant treasurer, and have been on the Board of Governors during the past 10 years. I have enjoyed my associations with other alumni very much and over the years have made some very good friends through the Club." That's a great letter from Jim, and it's really encouraging to your secretary to know that classmates still keep in touch with each other and the Institute.

Bob Reebie, Assistant Vice-president, Market Planning and Research, New York Central System, presented a paper on "Efficient Transfer Terminals" before the National Transportation Engineering Conference of the American Society of Civil Engineers. His illustrated presentation concerned the newer concepts in engineering rail-highway transfer terminals. . . . **Sam Maloof** was named by Governor Peabody to the Atomic Energy Commission. A physical scientist at the Defense Documentation Center at Bedford, Mass., Sam received his doctorate in metallurgical engineering at Pennsylvania State College. . . . **Herbert M. Johnson** has been named vice-president, engineering, of Edo (Canada) Ltd. in Cornwall, Ontario. A leading authority in the field of sonar engineering, he has for the past 13 years been associated with Sangamo Electric Company, Springfield, Ill., where he served as chief engineer and director of research and advanced projects. Previous to that he had spent seven years with General Electric in Schenectady as test and project engineer. . . . **Russ Bowen** of Medford, Mass., was the speaker at the St. Joseph's Book Club there on the subject "Soviet Russia and Communist China," in January. He spoke of his extensive travels in both countries, the last trip to Russia being in 1949. Russ is a lieutenant colonel in the Army Reserve, and is employed as a specialist weapon engineer at Arthur D. Little, Inc. of Cambridge. . . . The June Alumni Day at the Institute will be only a month away when you read these notes, and I want to personally urge those in the area to attend. One Monday in June won't be missed in your busy work schedules, so take the day off and join the gang.—**Richard M. Feingold,** Secretary, 10 North Main Street, West Hartford, Conn. 06107.

'44

Last week I was in Pittsburgh for a one day stand, and had a chance to meet **Warren Howard,** II, for breakfast. He has been there for the past five years as the local director for Morgan Construction Company of Worcester, Mass. Prior to that Warren was with the Industrial Control Division of General Electric. He reports that he very much likes the new Pittsburgh, and that he has just started a new assignment in the area of new product market research for his firm. He has a number of ideas which have already gotten some study. Warren is quite proud of the fact that his son Peter is about ready to go to college, and at the time that I was in Pittsburgh, Peter was expecting to hear from several schools including M.I.T. Warren also reports that he saw **Bob Bartz,** VIII, recently, and that Bob is back on the West Coast, and is no longer in Denver. Warren didn't have any more information to offer.

George Wilson, VI, has recently published an article in the I.E.E.E. Transactions, and as a result there was a short note on his activities. He has been with Raytheon for quite some time, most recently at the Wayland, Mass., laboratory where he is administrator for the Array Radar Organization. . . . A note from the Concord, Calif., Transcript advises that **Harry Majors,** II, who is now Professor Majors of Seattle University, is working under a $52,000-contract from the Army Research Office studying thermal fatigue in metals, one of the major problems in supersonic airplanes and space craft. Harry and his family have been in the Seattle area for the past five years. . . . **Abraham Goldberg,** IV, has been appointed director of architecture and construction for Universal Food Systems, and he will assume architectural responsibility for all Dunkin' Donut operations in the U.S. and Canada. He will direct the designing and erection of 50 franchise operations planned for this year.

Bob Oppenlander, XV, has been elected vice-president—finance, and treasurer for Delta Airlines in Atlanta. Previously he was comptroller and treasurer. . . . The **Heilmans** have decided that we can't miss the reunion which takes place June 12 to 14 in Lenox, Mass., at the Curtis Hotel. I've been getting notes from **Scott Carpenter,** who is heading up the committee on the reunion, and it seems he has a terrific program lined up. In fact, from what he has sent down in the way of information and plans, this is going to be the best buy in reunions that the Class of '44 has seen to date. See you there!—**P. M. Heilman,** Secretary, 30 Ellery Lane, Westport, Conn.

'46

The 1963 M.I.T. President's Report just came out, and on a quick scan through it two names jumped out at me. Congratulations are in order to both **Walter A. Backofen** and **William M. Siebert.** Both Walt and Bill were promoted from associate professors to full professors of M.I.T. . . . **Sheung S. Chin** has changed his address to 2142 Mohican Trail, Maitland, Fla. Other address changes are **John V. Belliotti,** 8935 Grif-

fon Avenue, Niagara Falls, N.Y.; **James R. Braxton,** Duro Test Corporation, 839 Hope Street, Springdale, Conn.; **Harvey S. Freeman,** Independent Engraving Company, 14360 Washburn Avenue, Detroit Mich.; Captain **John W. Crawford, Jr.,** 59 Cherry Lane, Syosset, N.Y.; **Philip Freund,** CP 54, Porto San Giorio, Italy; Colonel **Straughan D. Kelsey,** 318 North Terrace, Lake Worth, Fla.; **Robert H. Marks,** Apt. 22A, Saint James Place, Brooklyn, N.Y.; **Gifford H. Stanton,** 294 North Wilton Road, New Canaan, Conn.; **John A. Russell, Jr.,** 488 Beacon Street, Boston, Mass.; Commander **Richard Riley,** Bureau of Ships, Code 630, Navy Department, Washington, D.C.; **Dimitry Poutiatine,** 35 Parkway East, Mt. Vernon, N.Y.; **Charles E. Peck,** 572 East Front Street, Perrysburg, Ohio; **Arnold B. Whitaker,** 250 Berry Hill Road, Syosset, N.Y.

We are sorry to have to report the passing of three class associates. **John L. Genta,** 605 Anderson Street, Carlinville, Ill., **Dominic S. Acierno,** 518 South Craig Street, Pittsburgh, Pa., and **Alfred R. Lichten,** 44 East 67th Street, New York, N.Y. A short note from one or two of our readers would be appreciated.—**John A. Maynard,** Secretary, 25 Pheasant Lane, North Oaks, St. Paul 10, Minn.

'47

Russell W. Sloan has been appointed to the new post of vice-president of development and planning for the Morton Chemical Company, a division of Morton Salt Company of Chicago. Sloan, formerly manager of development and planning, will direct Morton Chemical's continuing program aimed at widening company interests here and abroad that now include inorganic and organic chemicals, formulated agricultural pesticides, polymers, resin coatings and photographic chemicals. . . . **Thomas P. Cheatham, Jr.** has been elected a corporate vice-president of Litton Industries. He will make his headquarters in Washington and will also coordinate technical planning and marketing activities of company offices in Houston, Dayton, and Los Angeles. . . . **John C. Fisher** was named manager of liaison and transition at the General Electric Research Laboratory. Dr. Fisher joined the Research Laboratory staff as a physicist in 1947. He has served as manager of physical metallurgy research in the Metallurgy and Ceramics Research Department and is widely known for his contributions as a theoretical physicist to the areas of solid-state science and studies of crystal structure. Dr. Fisher is president of the board of directors of the American Museum of Electricity, which is planning a $10-million "living museum" to be constructed on a site recently purchased near Lock 7 in Niskayuna. In his new position, Dr. Fisher will direct the activities of a group of liaison scientists whose job is to maintain a two-way flow of information between the research laboratory and the operating components of the company. He also will be responsible for speeding the transition of research results into new and improved General Electric products. . . . **B. J. Milleville** has been appointed director of engineering and research at the Chapman Division of the Crane Company. . . . **Edward D. Kane** has announced his entrance into the consulting field with offices in Hartford, Conn., serving nuclear, chemical processing, and space-aircraft equipment manufacturers. His managerial and marketing experience was gained as vice-president, sales, Kohn and Company, and sales manager of instruments and controls. He also was associated for 10 years with the Cuno Engineering Corporation as sales engineering manager, divisional sales manager and director of development. He is a member of the Committee of Equipment Sales of the American Institute of Chemical Engineers and has served as chairman of several symposia in this field. He also has served on several committees sponsored by the Society of Automotive Engineers, dealing with product standardization.

At Strathmore Company, the industrial engineering and industrial relations functions will be combined in one department and will be headed by **John F. Dimodica.** John was formerly supervisor of industrial engineering at the company. . . . **Thaddeus M. Nosek** of Bridgeport was recently appointed as West Hartford's new director of public works. He has 23 years of service in public works with the Corps of Engineers. Nosek was selected from among 50 applicants. . . . **Herbert C. Wieland,** former director of city planning for St. Paul, Minn., has become associated with the firm of Spink Engineering Company, Carmichael, Calif., as director of planning. . . . **Arthur J. Zito** was recently the principal speaker at the fourth annual dinner dance of the Chamber of Commerce, Springfield, Mass., at the Shaker Farms Country Club. His speech dealt with "Living with the Space Age," providing suggestions for simplifying today's living in an increasingly complex age.

Classmate **Ezra S. Krendel** is presently the technical director of the Operations Research Division, Franklin Institute of Laboratories, in Philadelphia. Mr. Krendel recently wrote a paper on"Human Factors in Electronics" which appeared in the I.E.E.E. Transactions. . . . A paper on "Antennas and Propagation" written by **Walter Rotman** also appeared in the I.E.E.E. Transactions. Mr. Rotman has been associated with the Microwave Physics Laboratory, Air Force Cambridge Research Laboratories, Bedford, Mass., as chief of the Plasma Electromagnetics Branch. . . . At MITRE, Dr. **Edward M. Bennett** will head the System Sciences Department.

The following changes of addresses have been received: **Herbert E. Anderson,** 9 Lloyd Haven Drive, Huntington, N.Y.; **Victor Azgapetian,** 233 Amherst Road, Costa Mesa, Calif.; Reverend **Earl J. Dionne,** 802 N. Jackson Street, Milwaukee, Wis.; Dr. **Aaron Fleisher,** 26 Chestnut Street, Brookline, Mass.; Dr. **Wilfred L. Freyberger,** Michigan Technological University, Houghton, Mich.; **Frederick C. Grant,** 399 Stanton Road, Newport News, Va.; **M. Guys Hardin, Jr.,** 886 Victoria Place, Glendale, Mo.; Dr. **Donald R. Harleman,** M.I.T., Cambridge, Mass.; **Robert D. Harvey,** 3932 Forest Street, Western Spring, Ill.; **Judd W. Healy,** 705 Rivermont Drive, St. Louis, Mo.; Commander **Theodore Hechler, Jr.,** 1135 Madison Street, Annapolis, Md.; **Martin W. Hellar,** 25 Westwood Circle, Dover N.H.; **Olavi A. Huhtala,** 9131 Kephart Drive, Mentor, Ohio; **Lester N. Lechter,** Fuller Place, Dedham, Mass.; Professor **Kevin A. Lynch,** M.I.T., Cambridge, Mass.; Professor **Robert H. Maybury,** UNESCO, Director of Basic Science Training, Place de Fontenoy, Paris, France; Dr. **Victor Mayper, Jr.,** 3942 Madelia Avenue, Sherman Oaks, Calif.; **Walter E. Piazza Tangius,** Piazza y Val des Ingenieros S.A., Huallago 434-701, Lima, Peru, S.A.; **Arthur Roberts,** 17 Minuteman Drive, Concord, Mass.; **Douglas L. Schultz,** 5715 Priory Lane, Birmingham, Mich.; Captain **Kenneth M. Tebo,** 6370 Pennsylvania, Kansas City, Mo.—**Martin M. Phillips,** Secretary, TYCO, Inc., Hickory Drive, Waltham, Mass.

'48

This is early-middle March of what has been, for those of us in Northern New England, an amazingly "open" winter. At the moment we are in the grip of a Nor'easter which promises to make up some for lost time and which should give the skiing enthusiasts among us cause for rejoicing. We would like to ramble on in this almanacky fashion, complete with hoary witticisms and ancient recipes, but the mail pouch, although very thin, has some items worthier of your attention. **Holt Ashley,** Professor of Aeronautics and Astronautics at Tech, is an associate editor of the A.I.A.A. Journal. . . . A clipping from a Hartford Times of last January notes that Dr. **Duane S. Cooley,** Senior Research Scientist with the Travelers Research Center in Hartford, was the speaker at a meeting of Young People's Fellowship of Christ Episcopal Church. . . . Colonel **Pierre V. Kieffer, Jr.,** has been appointed president of Vermont Technical College in Randolph Center, Vt. Colonel Kieffer is a registered professional engineer who holds a M.S. in civil engineering from Tech and a M.A. in international affairs from George Washington University. . . . **Peter Thornton** of Ann Arbor, Mich., was appointed last January to the new post of manager, operations planning for United States Envelope Company, of Springfield. He has worked for R. P. Scherer Corporation of Detroit as assistant director of marketing; Chrysler Corp., Highland Park, Mich., as manager of corporate volume planning; Ford Motor Company, Livonia, Mich., as supervisor of marketing plans; and Permacel division of Johnson & Johnson of New Brunswick, N.J., as manager of manufacturing services. . . . **Hans U. Wydler** has been appointed a vice-president and officer in charge of the International Department of Manufacturers National Bank of Detroit. Previously he was active in the credit and

commercial loan areas and the International Banking Department of the Chemical Bank and Trust Company of New York. The preceding notes were written by Secretary **Mott;** the following report came from Western Correspondent **Baum** in Phoenix.

Vincent E. Lally recently lectured at Regis College on the topic "Scientific Ballooning as Related to Atmospheric Research." Vince is director of the National Scientific Balloon Flight facility of the National Center for Atmospheric Research at Boulder, Colo., and is chairman of the American Meteorological Society Committee on Atmospheric Measurements. . . . **Norman H. Kreisman** is vice-president and general manager of the recently formed Responsive Environments Corporation, 21 East 40th Street, N. Y. Responsive Environments Corporation has been assigned exclusive marketing rights to McGraw-Edison Company's "Responsive Environment" teaching system. The "Responsive Environment" equipment is designed to program electronically any subject material and can be instantly switched to respond to the pupil in any of six languages. The Associated Tutors could use one of those.

We have received notice that Professor and Mrs. **Robert R. Ferens** were guests of honor at a reception held by the Friends of the Museum of the University of Oregon. The Ferens have just returned from a two-year residence in Ghana and have their collection, "Arts and Crafts of West Africa," on display at the museum there at the university. . . . Dr. **Donald J. Blickwede,** Director of Research of Bethlehem Steel Company, has announced the appointment of Dr. **Theodore B. Winkler** as assistant general manager of Bethlehem's Homer Research Laboratories. . . . Professor **Robert J. Hansen** of the Department of Civil Engineering began a recent article in the Journal of Engineering Education with the statement: "Models can contribute significantly to the education of structural engineers." Models have also contributed significantly to the education of a number of liberal arts majors, but Professor Hansen's article, "Models for Shell Structures," is concerned with the development of shell structures which may be fabricated, structurally loaded, and tested with reasonable facility by his students. The shell models are made by vacuum-forming polyvinyl chloride sheets over a plaster of Paris mold. The resultant shells have rather consistent structural properties and their load-bearing capabilities can be ascertained by the attachment of an appropriate selection of incremental loads. Although the article is concerned primarily with the educational aspects of the technique, Professor Hansen points out the increasing use of modeling techniques in structural research and design is one really significant development underway in structural engineering.

Professor **W. D. Kingery** is the co-author of "Physical Properties of Polycrystalline Silicone Borides" which appeared in the American Ceramic Society Bulletin. . . . We have news from two of the Army contingent. Colonel **Foster L. Furphy,** who received the M.S. in mechanical engineering in 1948, has retired. He was formerly chief of staff of the Army Missile Command. . . . Colonel **Charles D. Ostrom, Jr.,** who also received the M.S. in mechanical engineering, has been named commanding officer, Army Ballistic Research Laboratories and commanding officer, Army Coating and Chemical Laboratory, Aberdeen Proving Ground, Md.—**Robert R. Mott,** Secretary, Box 113, Hebron, Maine; **Richard V. Baum,** Assistant Secretary, 1718 E. Rancho Drive, Phoenix, Ariz.; **John T. Reid,** Assistant Secretary, 80 Renshaw Avenue, E. Orange, N.J.

'49

Except for news of this year's class reunion, which will appear elsewhere in this column, we have only three news items to report. **Norman Chrisman, Jr.** will represent M.I.T. at the inauguration of John Wieland Oswald as president of the University of Kentucky on April 28. Norman lives in Lexington, Ky., and is an Educational Counselor for M.I.T. . . . From the I.E.E.E. Transactions dealing with microwave theory and techniques comes a short biography of Dr. **Richard H. Pantell** (S.B., M.S.). He left M.I.T. and taught electrical engineering at the Polytechnical Institute in Brooklyn, N.Y., in 1950-1951. From 1951 to 1954 he was a research assistant at the Stanford Electronics Research Laboratory, investigating new techniques for network synthesis. He received his Ph.D. degree in electrical engineering from Stanford University in 1954. Starting as an assistant professor of electrical engineering, he has been working at Stanford University ever since, except for two leaves of absence. In 1956-1957 he was a visiting assistant professor at the University of Illinois in Urbana, and during 1962-1963 he was at the Standard Telecommunications Laboratories in Harlow, England. His most recent work at Stanford University is concerned with ferro-electrics, cyclotron resonance in electron beams, multiple quantum processes, and nonlinear optical effects.

Nisson A. Finkelstein (Ph.D.) has been awarded a fellowship from the Rochester Museum of Arts and Sciences. Leaving Cambridge with his doctorate, he went to Rochester, N.Y., to be assistant director of research and engineering and then director of research and development at Bausch and Lomb, Inc. He is now with General Dynamics/Electronics as vice-president, research and engineering in charge of electronics and engineering research and development. His personal research contributions in diffraction grating design and spectrography have led him into the use of computers and electronic instrumentation in optical research and design. Now for reunion news.

With reunion time only a month away, here is a summary of the details of the affair. Registration will start after lunch on Friday, June 2, at the Belmont Hotel West Harwich on Cape Cod. (We will send detailed road maps to all whom we think will be coming.) We have taken over the whole place and there will be plenty of room for any of you who decide at the last minute that you are coming. A warm welcome will await you however early or late you let us in on your plans but obviously it would help us plan the affair better if we hear early. Returns so far have been excellent. When you arrive, we will take your picture and post it on the bulletin board along with the pictures of all the others who have arrived. Everyone will be able to refresh his memory on names and faces this way. With the presidential conventions only a month or so away, we thought it would be fitting to have our own convention and show the politicians a thing or two. In the process, we will elect new class officers, eat a lot of good food, enjoy the hotel's numerous recreational facilities, have the official five-year softball game, and generally have an interesting and enjoyable time.

We still continue to hear from men who have not received our mail. We don't intend to neglect a single soul but it can happen. For example, **Rick Richardson** writes from Whittier, Calif., that "There is a good possibility that I will be in the East in June and attend the 15th Reunion of the class. In all probability, my family will be along with me. My principle difficulty, at this time, (February 18) is getting further information on the whole affair. I apparently mislaid, or never received, the early data. Therefore, will you please send me information on the place, date, time, etc. Thanks so much for your efforts." Well Rick, if you don't hear from us this time, the vice-president in charge of addressing envelopes will get demoted to second assistant stamp licker, just you wait and see! And any of the rest of you who are in Rick's predicament, please let me know and I will ship you the information by return mail. **Dick Lang** and **Kemon Taschioglou** are a committee of two to dream up appropriate prizes to be awarded to you men and ladies who have excelled in various top secret categories. You may have won a prize already! **Tom Tsotsi** will be the only other person to know about the prizes because he has to buy them along with all the other tonnage of supplies which we will wear, use, or consume. Kemon will announce the prizes at the banquet Saturday night. See you all there! **Frank T. Hulswit,** Secretary, 197, Knights-bridge, London S.W. 7, England; **Fletcher Eaton,** Assistant Secretary, 83 Herrick Road, Newton Centre, Mass. 02159.

'52

We are back at the old stand again with news. The first item is the Annual Cocktail Party and dinner on June 12 from six o'clock on at the Faculty Club. Reservations can be made with **Nick Melissas,** 435 Boylston Street, Newton Center, 969-6419. Let's see a good turnout. . . . **Brenton Groves** writes in that he received his M.S. in engineering from the University of Akron in June, 1963, and at present is working on his Ph.D. at Ohio State and holds the position of re-

search associate at the Ohio State Antenna Lab, where he has just completed some very successful communication experiments in which signals were bounced off Echo II. . . . **Jim Davidson** is back in the New York City area working for Univac in the budgetary fields. Univac is a division of Sperry Rand Corporation. . . . **Arthur Chivers** has just been named division manager at the Wright Line Division, Barry Wright Corporation, here in Massachusetts. . . . **John Myer** is one of the two co-winners (joint collaborators) of the $5,000-first prize for the design of the new Boston Architectural Center in the Back Bay. The five-story concrete building was judged the best solution to a number of tricky problems out of an international field of 89 entries. John is a member of the M.I.T. faculty and the Cambridge Planning Board, and has established a reputation through designs for dormitories and a musical auditorium at Marlboro College (Vermont), he is also working on a civic center for Ogunquit, Maine.

Also in Architecture, the Canadian World Exhibition Corporation has appointed **Kiyoshi Izumi** of Regina, Saskatchewan, to its advisory board for the 1967 World's Fair in Montreal. Mr. Izumi, senior partner in the firm of Izumi, Arnott and Sugiyama, is one of 12 appointees from across Canada. The board will not necessarily design buildings, but will comment and advise upon architectural and related elements which will reflect the characteristics and aesthetic qualities of the exhibition. . . . **Richard L. Tavis** has been elected a vice-president of the Genesee Merchants bank and Trust Company, where he will be in charge of research and planning. . . . Dr. **J. David Robertson** has been appointed to a tenure post on the Faculty of Medicine at Harvard University as associate professor of neuropathology at McLean Hospital. Dr. Robertson is credited with originating and validating the "unit membrane" theory of cell structure, developed through electron microscopy.

Bill Vogt writes from New York that he is still practicing patent law with Watson Leavenworth Kelton and Taggart and mentions that **Werner Kahn** had just been up from Rio de Janeiro for a six weeks' visit. Werner is with Standard Electrica, the Brazilian subsidiary of ITT. . . . **Harold Taylor, Jr.** has been appointed sales manager of Mesta Machine Company, Pittsburgh, Pa. . . . Dr. **Lowell W. Steele** has been named consultant on research operations at General Electric Research Laboratory, Schenectady, N.Y., where he will lead teams studying and evaluating research operations there and will provide advice and counsel concerning utilization of research in industrial operations. . . . **Richard Hickland** has been elected vice-president of operations at the Oxford Paper Company, Rumford, Maine; he was formerly a management consultant with McKinsey and Company. . . . **John F. Jacobs** is now assistant vice-president at Mitre Corporation, Bedford Mass., and will be acting technical director of technical operations. . . . **Charles Springer** has been named chief engineer for Althouse Chemical Company of Reading, Pa., where he is supervising construction of Althouse's second plant at Gibraltar, Pa. Althouse is a division of Crompton and Knowles and makes textile dyestuffs and special chemicals. That about empties the mail bag for the while. Wish some of you people would drop a line once in a while and let the notes in on what you are doing; it's your column—**Dana M. Ferguson,** Secretary, 242 Great Road, Acton, Mass.

'54

Here are a few last minute news flashes to prime everybody for the gab-fests next month at Lenox, Mass. **Larry** and Margie **Leonard** are still in Cleveland, where Larry is professoring in metallurgy at Case Institute. The Leonards have two boys, and a third young one was due last month. At the time of this writing, no word has been received on whether Number 3 had arrived. . . . **Dick** and Ellin **Hayes** have been back in Washington, D.C., for several months, after a year in Houston. Dick is one of the higher-ups in NASA. He had a rather serious operation last July, but the latest word is that he is in good health again. The Hayes family includes two girls. . . . Dick Feingold, Secretary of the Class of '43, has sent us word that **George Spoll** has been elected president of the Home Builders Association of Hartford County, Conn. George is president of his own construction company in West Hartford and, says Dick, builds excellent houses. . . . **George Sebastyen** was recently made technical director of the Communication Sciences Laboratory of Litton Systems, Inc., in Waltham, Mass.

Bob Schultz, whose time is usually spent in organic chemistry research for Monsanto in St. Louis, has recently been involved in a special four-month post-doctoral course of study at the University of Illinois, where he received his Ph.D. in 1958. . . . **John Goncz** addressed the Boston Section of the I.E.E.E. in February on "Present State-of-the-Art Flashtubes for Laser Stimulation." John is a group leader in the Tube Research and Development Department of Edgerton, Germeshausen and Grier, Inc. . . . **Leslie Towle** has been appointed manager of the Fibre Department of Spalding Fibre Company in Tonawanda, N.Y. Leslie, his wife Alice, and their three children live in Tonawanda. And your weary secretary has been promoted to associate professor of mathematics at St. Louis University, effective next September. That does it for this month, except for a final reminder about our reunion: Curtis Hotel, Lenox, Mass., June 12-14.—**Edwin G. Eigel, Jr.,** Secretary, 4945-A Sutherland Avenue, St. Louis, Mo. 63109.

'55

A couple of wonderful newsletters arrived this month; it's a pity we can't pass them on verbatim, but perhaps you can catch some of their spirit as well as the factual details. . . . **Dave Brooks** and Toby are now immersed in the Washington, D.C., area life, Dave having decided to continue his studies in mineral economics for Resources for the Future. Last June he received his Ph.D. in economics (minor in geology) from the University of Colorado, having become something of a major expert on minor metals over the long thesis haul. The Brookses have bought a house in Arlington, and all four seem to be prospering there. Dave is present chairman of the Northern Virginia CORE and Toby a special assistant in charge of communications; their experiences in these capacities have been exciting and depressing, gratifying and frustrating, but on the whole surely satisfying—and admirable. Their less somber leisure activities include canoeing on the Potomac and Shenandoah in the lovely stretches not too distant from Washington in addition to imbibing the many attractions of the capital, and their joie de vivre is quite contagious! . . . From "the piney woods and mountains lakes region of Argentina" came the **'Nasatir'** newsletter. **Dave,** Mar, and their girls were vacationing in Bariloche for the month of February before returning to Buenos Aires for another term, the fall term (March, that is!) at the University and the American Community High School, where Mar, who has finished teaching English, will resume her mathematics teaching. In July they will be back in Berkeley briefly before setting up housekeeping in UCLA territory for their fall term. The Nasatirs have enjoyed the swimming, tennis, etc. in the numerous clubs of Buenos Aires; many short trips to country houses, to the river delta for water skiing, and to Atlantic beaches nearby; then a longer journey via Santiago, the Pacific beaches and points south and east in Chile, finally across the Andes to Bariloche in a boat! Their account of Argentine reactions to the President's death (varied, but mostly compassionate) was interesting and moving, as were their impressions of Christmas: "Argentines don't make much of Christmas." Ah, well, next Christmas will find the Nasatirs in Illinois for the holidays, doubtless brimming over with news for their families.

A few tidbits of interest: among the nominees for president of the A.C.S. organization in the Washington area is **Bill Purdy,** an associate professor at the University of Maryland; **Irwin Gruverman** is now head of the department developing and producing radioisotopes and radioactive sources at New England Nuclear Corporation. **Richard Slocum,** a resident of Portuguese Bend, Calif., and former head of the nuclear propulsion and power section at Spacecraft Sciences Subdivision at Aerospace Corporation in El Segundo, has been named head of the newly organized advanced concepts and techniques section. . . . **Reuben Schlegelmilch** has left Washington, D.C., to become manager of the advanced missiles programs at I.B.M. in Oswego, N.Y. Let us hear from you.—Co-secretaries: Mrs. **J. H. Venarde (Dell Lanier),** 2401 Brae Road, Ardentown, Wilmington, Del. 19803; **L. Dennis Shapiro,** Aerospace Research, Inc., 130 Lincoln St., Boston 35.

'56

Bill Caskey continues with Sandia in Albuquerque where he has been since graduation. However, it comes to our attention that he had developed an outside activity of considerable dimension. Bill has become a leader in local boy scout activities; in addition to being a troop leader he has been awarded the Wood Badge for leadership. . . . In February I met **Joe Collins** in the Faculty Club. Joe was at Tech recruiting for the research laboratories of the Linde Division of Union Carbide, where he is a development supervisor in molecular sieves. Joe lives in the Tonawanda, N.Y., area and has three children. . . . **Leonard Druding** is an assistant professor of chemistry at the Newark branch of Rutgers. The Drudings have a son, James Michael, born in October, 1963. . . . **Tom Grettenberg** was a teaching and research assistant in the Information Theory Group of the Research Laboratory of Electronics at Tech until 1959. Then he worked for the Autonetics Division of North American and the Lockheed Missile and Space Company. By 1962 he had earned his doctorate in electrical engineering at Stanford where he taught in the summer before he became an assistant professor at Caltech. . . . **Tom Jones** is now with Eastman Kodak in Rochester. Tom and Nancy have a second son, Larry, born in 1962. . . . **Dick Kinney** has joined our group of classmates at Hampshire Chemical of Nashua. Dick will be in sales. The Kinneys had a third child, Susan, in December. . . . **Bob Taylor** recently co-authored an article in the Bell Laboratories Record on electronic switching systems as applied to controlling a commercial telephone system. Bob has also worked on the Nike Zeus at Bell Labs.

Those who remember the New Hampshire mountain search for four Syracuse University students in February should be interested to know that **Ritner Walling** was a leader of the search party. . . . **Paul Walter** is with the Central Research Labs. of DuPont. Paul and Grace have two daughters, Katherine and Marjorie, born in 1960 and 1963. In October the Walter family will move to Stuttgart, Germany, where the company is sponsoring Paul for a year of study under Heinz Krebs at the Technische Hochschule.—**Bruce B. Bredehoft,** Secretary, 16 Mill Brook Road, Westwood, Mass. 02090

'57

Before dipping into the mailbag I would like to send along the news that **Ron Keefe** passed the Massachusetts Bar Examination and is now associated with the Boston firm of Crane, Inker, Oteri, and Marino at 41 Tremont Street. I am sure he would enjoy seeing any classmate desiring to have a will drawn up, contemplating a transaction in real property, or suffering from a back injury as a result of an automobile accident. . . . From halfway around the world (diagonally) came the following letter from **Bill Bateman:** "I have recently been appointed an M.I.T. Honorary Secretary in the Johannesburg area. The last year has been active.—I got married, went to Rio de Janiero for a honeymoon, and am now a father. It's a girl, so I don't expect she will go to Tech. Despite the world press, the United Nations, and the emerging "uncivilizations" north of here, we are enjoying quite a boom, with the usual shortages of skilled personnel that all countries have, considerably magnified. Not much chance for another long holiday for a good while." . . . Back in October I received a note from **Jay Bonnar.** It read as follows: "After spending three years as an engineering officer with the Air Force (SAC) I returned to M.I.T.'s School of Industrial Management and received my S.M. in 1961. Upon graduation I came down here to Connecticut as a development engineer for Anaconda American Brass Company. A new research center had just been completed prior to my arrival on the scene. Our primary function is to develop new materials and new markets. As you recall, I married Carol Rossiter during the summer of 1957, and now we have two children. We are living in Woodbury, a country town about 10 miles from work. I have just recently become active in the M.I.T. Alumni Club of New Haven and am club secretary this year. I play lots of golf and do quite a bit of sailing."

Otis Bryan wrote from Spain: "Currently I am a fighter controller at a radar squadron in Spain. This has been a fine tour. It will end in March with my reassignment to Holloman AFB in New Mexico as an astronautical engineer. I talked to **Dick Westerhoff** many times. He was stationed in Madrid as an F-102A pilot. He left in August to return to law school. We sit and wait most of the time, but every once and a while things get lively. During my tour I have spent quite a bit of time on temporary duty. There are three trips worth mentioning: a month in Libya at Tripoli for a rocketry meet; 45 days near Milan, Italy, working with the Military Advisory Assistance Group, and 30 days traveling in Spain evaluating other controllers. I just returned from 45 days leave in England and Sweden. I prefer leave in the winter for we are in the middle of a tourist area during the summer. Things jump for a while." . . . Next month I will dust off a few more letters.—**Frederick L. Morefield,** Secretary, 1A Acorn Street, Boston 8.

'58

Toni Schuman sent along a letter from **Eddie Changkasiri.** He wrote: "After you left the Institute in 1958, I went to the School of Industrial Management for two more years. Although I originally planned to go to the Harvard Graduate School of Business Administration I finally decided against it because I felt I should learn more about mechanical engineering as well as industrial management. After those two long years of grinding, I came back to Thailand where I belong and joined the Department of Industrial Promotion, Ministry of Industry, as a full-fledged government servant, mostly due to my obligation to the government. During these past three years many things had taken place. I got married in April, 1961, to a very charming Thai lady who graduated from Oberlin College and Columbia University. We spent our honeymoon in Japan, Taiwan and Hong Kong. In April, 1962, our daughter, Sansanee, was born. She is the only one we have at the moment. I also went back to the U.S. once again on an Asian Productivity Organization study tour around the world. Later on, I went to Ceylon and India to study the program for small industries development in those two countries. At the moment I am working as a counterpart of a U.N. expert on small industries development."

Jonathan Marc joined the **Hillel Auerbach** family February 29 this year. . . . This seems to have been a big month for publication of papers. **S. E. Estes** wrote "Speech Synthesis from Stored Data" in the IBM Journal, January 1964. **Aaron J. Gellman** is author of "The Value of Research for the Nation's Railroads," Traffic World, December 14, 1963. **P. G. Hill** wrote "Tubulent Wakes in Pressure Gradients," Journal of Applied Mechanics, December, 1963; and **Michael Koskinen,** "Elastic-Plastic Deformation of a Single Grooved Flat Plate Under Longitudinal Shear," in the Journal of Basic Engineering.—**Cornelius Peterson,** Secretary, 4 Rambling Brook Road, Upper Saddle River, N.J.; **Antonia D. Schuman,** 22400 Napa Street, Canoga Park Calif.

'59

Remember, the reunion is just one month away. I hope to see a tremendous turnout. IF any of you are driving through Boston on the way to the Cape don't be surprised if you see many sad faces on the single girls of the greater Boston area. **Alan Oppenheim** is getting married late next month. Opp called to tell me of his engagement to Phyllis Arnold of Woodstock Conn. Phyllis attended Jackson College and has been working at the Registrar's Office at Tech. . . . **Mike Brunschwig** now lives in South Bend, Ind., and works for Bendix at the Mishawaka Division of the Systems Analysis Group. Mike hopes to make the trip East to attend the reunion. . . . Class elections will be held at the reunion. If anyone is interested in carrying on the secretarial duties for a short time, until the next reunion, and cannot attend the class blast, please drop me a line as soon as possible. —**Robert A. Muh,** Secretary, 165 W. 66th Street. (7R), New York, N.Y. 10023.

'61

Ray Friesecke, newly-appointed full-time chairman of the Massachusetts Youth for Goldwater, tells me that the Youth for Goldwater Club at M.I.T. is the largest in the state, with over 90 members. Are

there any other politically active '61ers out there? . . . I saw **Leo Cannon** not long ago. He got out of the Army (101st Airborne) last December and was job-hunting when I talked to him. He told me that **Bill Scanlon** was to marry Nancy Blair on March 7 in St. John's, Newfoundland; **Dave Williams** was to be best man, Leo and **Bob Lewis** to be ushers. Best wishes to Bill and his bride! . . . A brief biographical profile of **Robert Oppenheim** in the "Contributors" section of the I.E.E.E. Proceedings placed him at the Polytechnic Institute of Brooklyn, N.Y. Bob is working on an M.S. with specialization in (brace yourself) "linear and nonlinear, feedback and sampled data, control and measurement systems." He also holds the title of manager (applications engineering) at Victory Engineering Corporation, of Springfield, N.J. . . . **Bill Watson** returns to Cambridge next fall, having recently been accepted at Harvard Business School. Bill further reports; "I am now working with Traffic Research Corporation in New York, a Canadian engineering firm which has made quite a name for itself in applying computer programming to transportation planning. **Arrigo Mongini** is also employed here."

John N. Kogan has been promoted to first lieutenant while serving in the U.S. Army Communications Zone, Europe. (USACOMZEUR, please). He is a systems analyst in the Data Processing Branch of the Army's Ordnance Supply Control Activity, which directs the procurement and distribution of ordnance material for U.S. military forces in Europe. John was employed as an engineer for analog and digital systems in Boston before entering the Army in May 1962; he has been in France since October of that year. He and his wife, Ann, live at 1 Place du Cloitre, Meung sur Loire (Loiret). . . . Second Lieutenant **Frederick Schmidt** completed a nine-week officer orientation course at the Chemical Center, Fort McClellan, Ala., last fall. Before entering the Army in June, 1963, he was employed as a chemical engineer by the Instrumentation Laboratory here in Cambridge. . . . The absence of '61 Class News in the past two Reviews was only partly caused by the dearth of communications from the class. I got involved in doctoral qualifying examinations, which weren't over until the first week in March. Happily, all went well, and by June I expect to have fulfilled all the requirements for my degree with the exception of the thesis. Since I expect it will be largely experimental in nature, the outlook is for at least another couple of years in nuclear engineering here at M.I.T. In any event, things are back to normal around 1610 Westgate, and you can expect class notes regularly.—**Joseph Harrington, 3rd,** Secretary, 1610 Westgate, M.I.T., Cambridge, Mass.

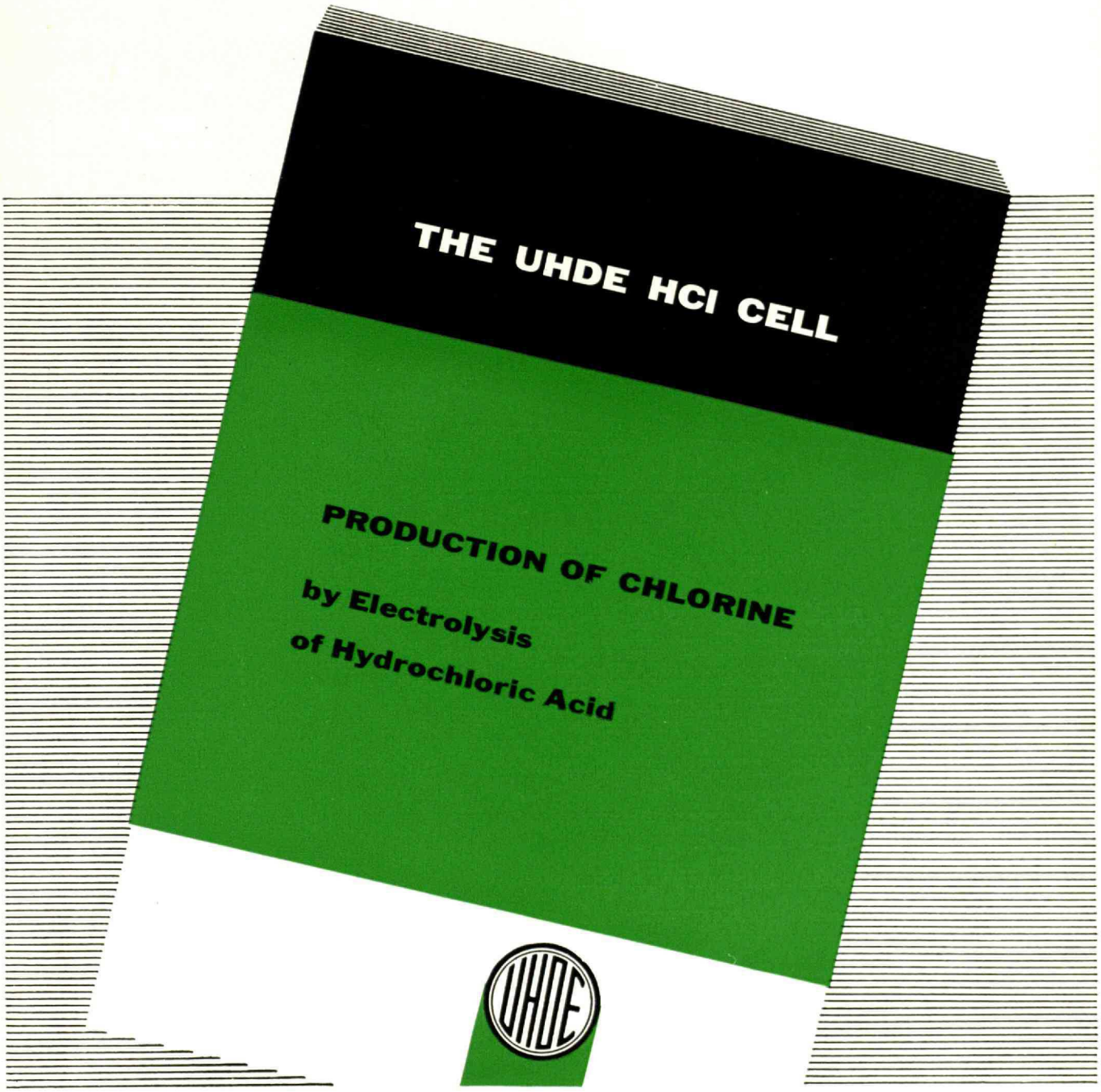
'62

Abe Aronow, XXI, and **Lynn Whelchel** broke the ice and wrote me from Dartmouth. They are both in their second year at the Dartmouth Medical School. Lynn is going to finish his last two years of med school at McGill University in Montreal. Abe will be going to Harvard Medical School next year. They seem to be making the best of their stay at Dartmouth; they have a big house in the country, and Lynn is a member of the ski patrol. They sent me all this information on the back of a post card, a fairly painless procedure if any of the rest of you are interested in making the attempt. . . . From my change-of-address forms (a class secretary's last resort for information), I found that Lieutenant **John Costello,** X, one of our class agents, is now stationed at the U.S. Armor Center in Fort Knox, Ky. I found out the name of the company **Jan Hyde,** I, is working for in San Francisco—Tudor Engineering Company; however, he called me not too long ago and said he was thinking about going with another company in S.F. . . . **John Uebbing,** VI, is living here in Palo Alto, but my clairvoyant powers have not been able to tell me what he's doing.—**Jerry Katell,** Secretary, Stanford Business School, Palo Alto, Calif.

'63

Finally two people have written me! **Woody Bowman** and **David Johnson** have responded to my pleas. From Woody came the following information: **Pete Van Aken** will marry Carol Gustafson, '65, in June. He is now working for Vice-president Kispert at the Institute. . . . **Martin Schrage** is working for E.G.&G. and recently returned from a month in Las Vegas. . . . **Paul Shapiro** is going abroad with the Crossroads Africa program. . . . **Frank Levy** is studying economics at Yale and now owns a Sprite. . . . **Mike Lifschitz** is at B.U. Med School, **Herb Eagle** is studying math at Brown, and **Henry Goldstein** is a physicist at the Harvard Observatory. **Ira Blumenthal** is getting married. **Al Womack** already did, last December. **Bruce Eisenstein, Larry Erdmann,** and **Juan Calvo** are also married now. **Dan Ross,** who is studying law at Pennsylvania, may be soon if he comes up to Wellesley any more frequently. That goes for **Bud Risser,** too. **Dick Reuthinger** is starting his Navy career in nuclear subs. Woody Bowman is eyeing graduate study in public administration. The Technology Loan Fund Drive for our Class of '63 Fund has produced 70 donations of an average $15 apiece so far. Of course it's still not too late to give.

From Dave we learned that Mike Aquino, Dan Spiers, Mike Weisskopf, and Dave Johnson are all at Westinghouse. Dave is due to go into the Army this month as a second lieutenant. **Al Ramo** is at Caltech. **Harley Jordan** is working for G.E. at Huntsville, **Steve Johnson** is with A.D. Little in Cambridge, and **John Cheney** is co-partner of an architectural firm in Anacortes, Wash. Remember send money to the Class of '63 Loan Fund and letters to me.—**L. Robert Johnson,** Secretary, F-41 McCulloch Hall, Harvard Business School, Boston 63, Mass.



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- Multiple ranges match a wide variety of loads.
- Output transformer designed to prevent saturation when dc is passed through secondary.
- Capacitor-tuned, Wien-bridge oscillator combined with a low-distortion power amplifier provides true sine-wave output.
- Power amplifier can be used separately with external signal sources.
- All solid-state circuits.
- No power-factor limitations.
- Output is continuously monitored by an overload sensing circuit that activates whenever safe limits are exceeded. Reset switch restores circuit.

OUTPUT: 200 voltamperes, 50 cps to 1 kc. Beyond 1 kc, see plot.

Voltage and Current Ranges

0-4	0-12.5	0-40	0-125	0-400	volts, rms
0-5	0-5	0-5	0-1.6	0-0.5	amps, rms

Output transformer will pass dc equal to rated ac.

Harmonic Distortion: 1% from 100 cps to 10 kc, 2% from 50 to 100 cps.

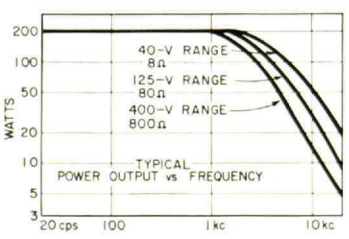
Hum: Better than 50 db below maximum output.

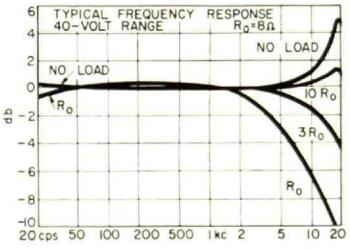
AMPLIFIER:

Input: 10 kilohms.

Sensitivity: Approximately 2 volts needed for full output.

POWER REQUIREMENTS: 105 to 125 or 210 to 250 volts, 50-60 cps, 70 to 500 watts (depending on load).





GENERAL RADIO COMPANY

WEST CONCORD, MASSACHUSETTS

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